

**APPENDIX C**  
**CHARPY V-NOTCH PLOTS FOR EACH CAPSULE**  
**USING HYPERBOLIC TANGENT**  
**CURVE-FITTING METHOD**

Contained in Table C-1 are the upper shelf energy values used as input for the generation of the Charpy V-notch plots using CVGRAPH Version 4.1. Lower shelf energy values were fixed at 2.2ft-lb. The unirradiated and irradiated upper shelf energy values were calculated per the ASTM E185-82 definition of upper shelf energy.

Table C-1  
Upper Shelf Energy Values Fixed in CVGRAPH

Material	Unirradiated	Capsule S	Capsule T	Capsule V	Capsule X
Inter. Shell Forging 123P461VA1	145	128	148	N/A	N/A
Lower Shell Forging 123S266VA1	148	122	N/A	166.5	162
Weld Metal SA1101 and SA1094 Heat # 71249	64.7	N/A	58.5	47.8	45
Heat Affected Zone	177	N/A	167	163	158
Standard Reference Material	67.5	60	72	65.6	67

# UNIRR INTER SHELL FORGING 123P461VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 15:02:30 on 06-14-2002

Page 1

Coefficients of Curve 1

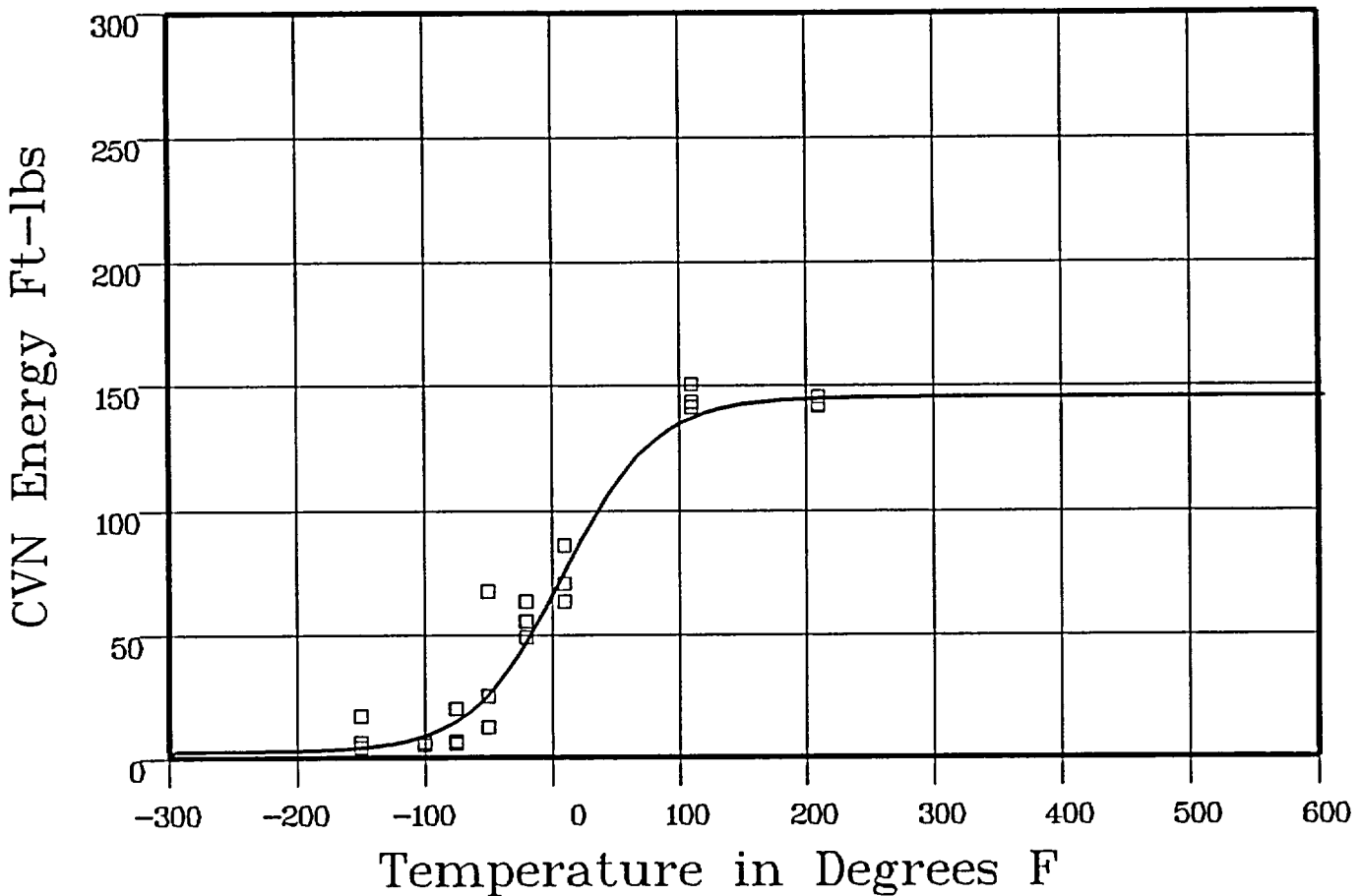
A = 73.59	B = 71.4	C = 72.41	T0 = 3.95
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 145 Fixed    Temp. at 30 ft-lbs: -47.4    Temp. at 50 ft-lbs: -20.9    Lower Shelf Energy: 219 Fixed

Material: FORGING SA5082    Heat Number: 123P461VA-1    Orientation: LT

Capsule: UNIRR    Total Fluence:



Plant: TP3    Cap: UNIRR    Material: FORGING SA5082    Ori: LT    Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-150	4	4.2	-2
-150	6	4.2	1.79
-150	17	4.2	12.79
-100	5	9.85	-4.85
-100	6	9.85	-3.85
-100	5	9.85	-4.85
-75	6.5	16.69	-10.19
-75	20	16.69	3.3
-75	5.5	16.69	-11.19

\*\*\*\* Data continued on next page \*\*\*\*

# UNIRR INTER SHELL FORGING 123P461VA-1 (TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-50	125	28.46	-15.96
-50	25	28.46	-3.46
-50	67	28.46	38.53
-20	48.5	50.8	-2.3
-20	63	50.8	12.19
-20	55	50.8	4.19
10	70	79.54	-9.54
10	85.5	79.54	5.95
10	63	79.54	-16.54
110	143	137.75	5.24
110	141	137.75	3.24
110	150	137.75	12.24
210	142	144.51	-2.51
210	145	144.51	.48
210	141.5	144.51	-3.01
SUM of RESIDUALS =			11.48

# CAPSULE S INTER SHELL FORGING 123P461VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 15:02:30 on 06-14-2002

Page 1

Coefficients of Curve 2

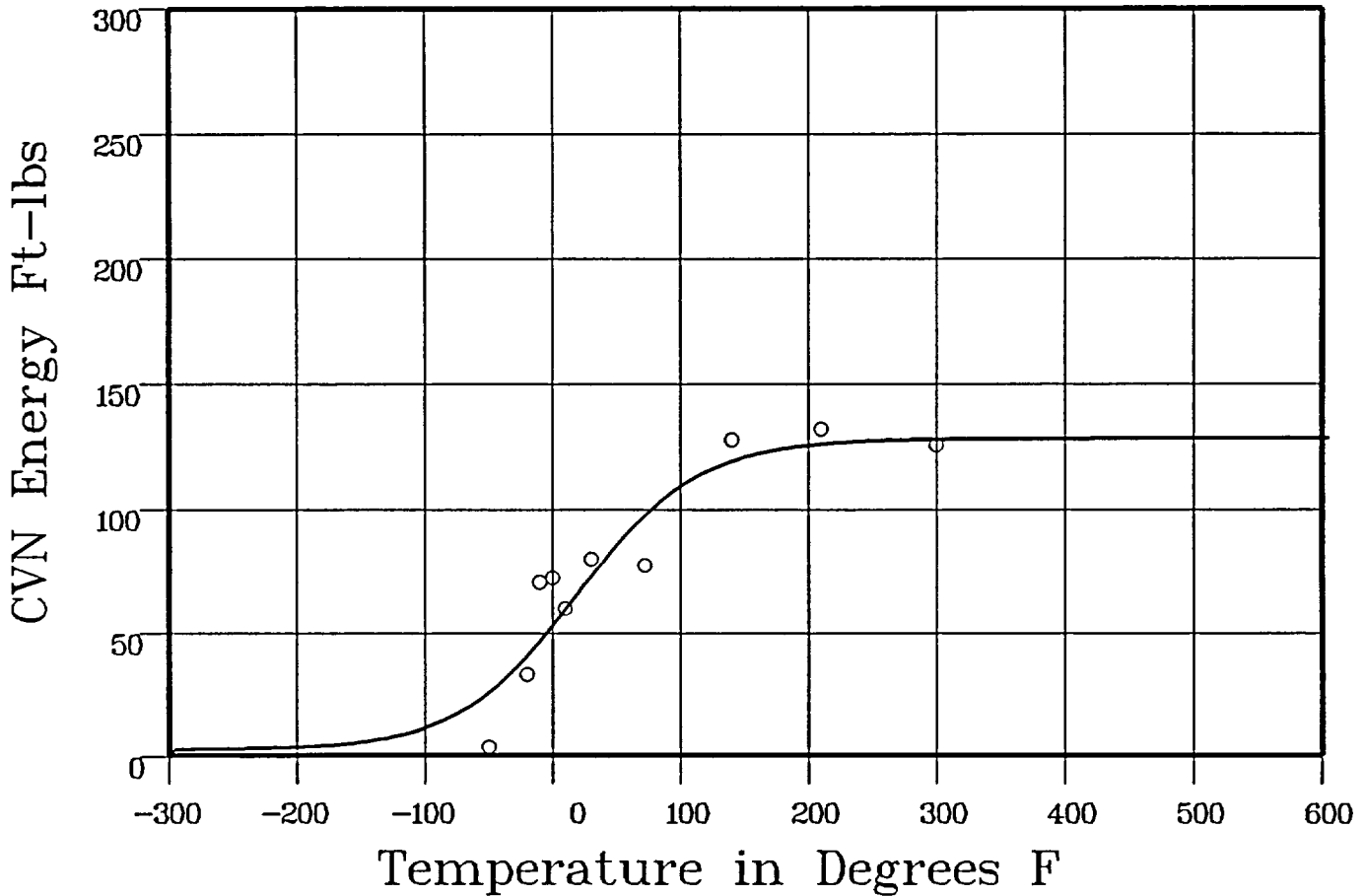
A = 65.09	B = 62.9	C = 93.89	T0 = 1453
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Equation is:  $CVN = A + B * [ \tanh((T - T0)/C) ]$

Upper Shelf Energy: 128 Fixed    Temp. at 30 ft-lbs: -44.6    Temp. at 50 ft-lbs: -8.4    Lower Shelf Energy: 2.19 Fixed

Material: FORGING SA5082    Heat Number: 123P461VA-1    Orientation: LT

Capsule: S    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: S    Material: FORGING SA5082    Ori: LT    Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-50	35	27.59	-24.09
-20	33	42.95	-9.95
-10	70	49.03	20.96
0	72	55.44	16.55
10	59.5	62.06	-2.56
30	79.5	75.37	4.12
72	77	99.41	-22.41
140	127.5	119.87	7.62

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE S INTER SHELL FORGING 123P461VA-1 (TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: S Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input CVN Energy	Computed CVN Energy	Differential
210	132	126.07	5.92
300	125.5	127.71	-2.21
			SUM of RESIDUALS = -6.03

# CAPSULE T INTER SHELL FORGING 123P461VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 150230 on 06-14-2002

Page 1

Coefficients of Curve 3

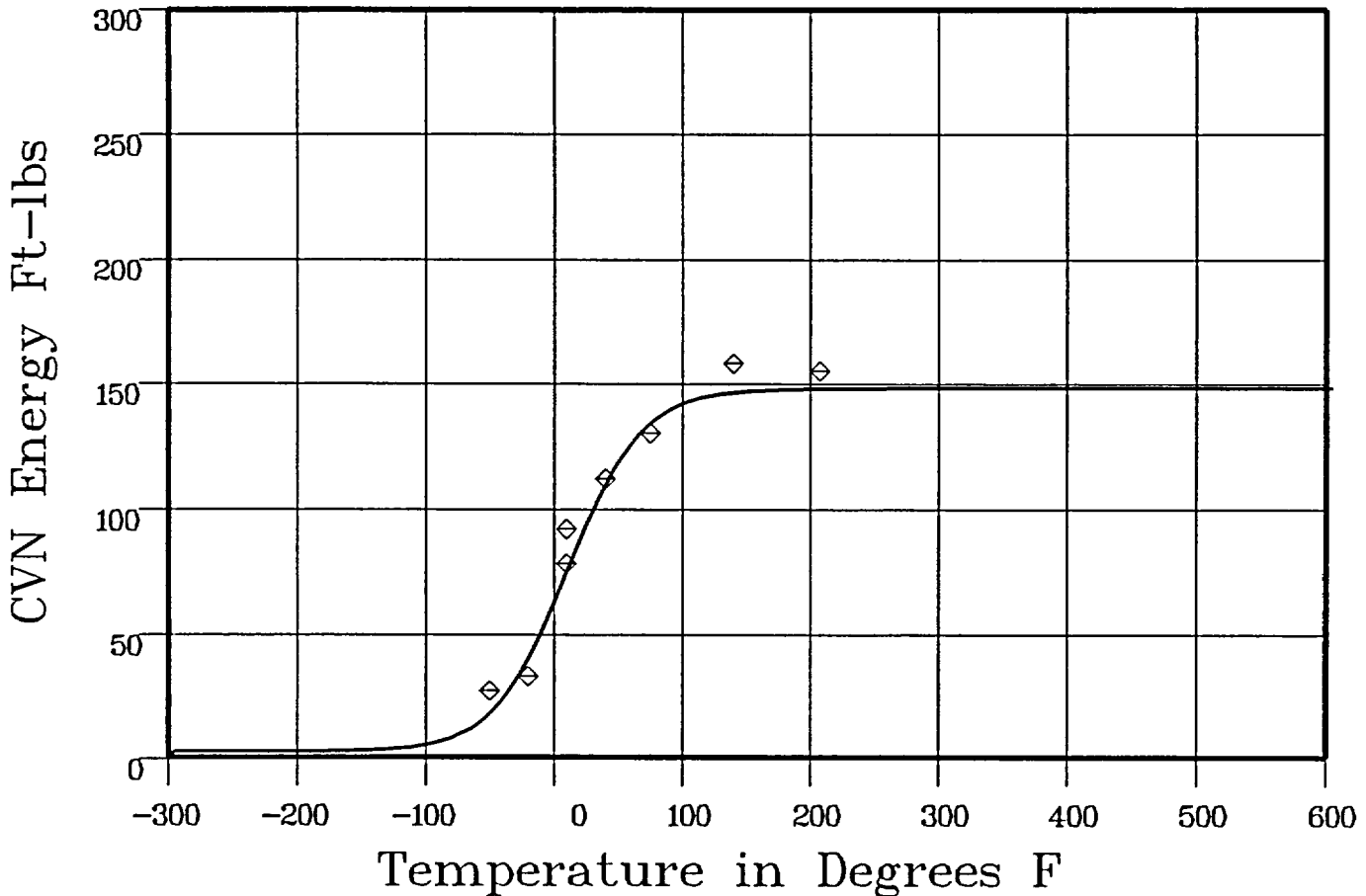
A = 75.09	B = 72.9	C = 57.54	T0 = 562
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 148 Fixed    Temp. at 30 ft-lbs: -35.9    Temp. at 50 ft-lbs: -15    Lower Shelf Energy: 219 Fixed

Material: FORGING SA5082    Heat Number: 123P461VA-1    Orientation: LT

Capsule: T    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: FORGING SA5082    Ori: LT    Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-50	27	20.62	637
-20	33	44.62	-11.62
10	92	80.63	11.36
10	78	80.63	-2.63
40	112	114.11	-2.11
75	130	135.99	-5.99
140	158	146.64	11.35
208	155	147.87	7.12

SUM of RESIDUALS = 1385

# UNIRR INTER SHELL FORGING 123P461VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 15:25:22 on 06-14-2002

Page 1

Coefficients of Curve 1

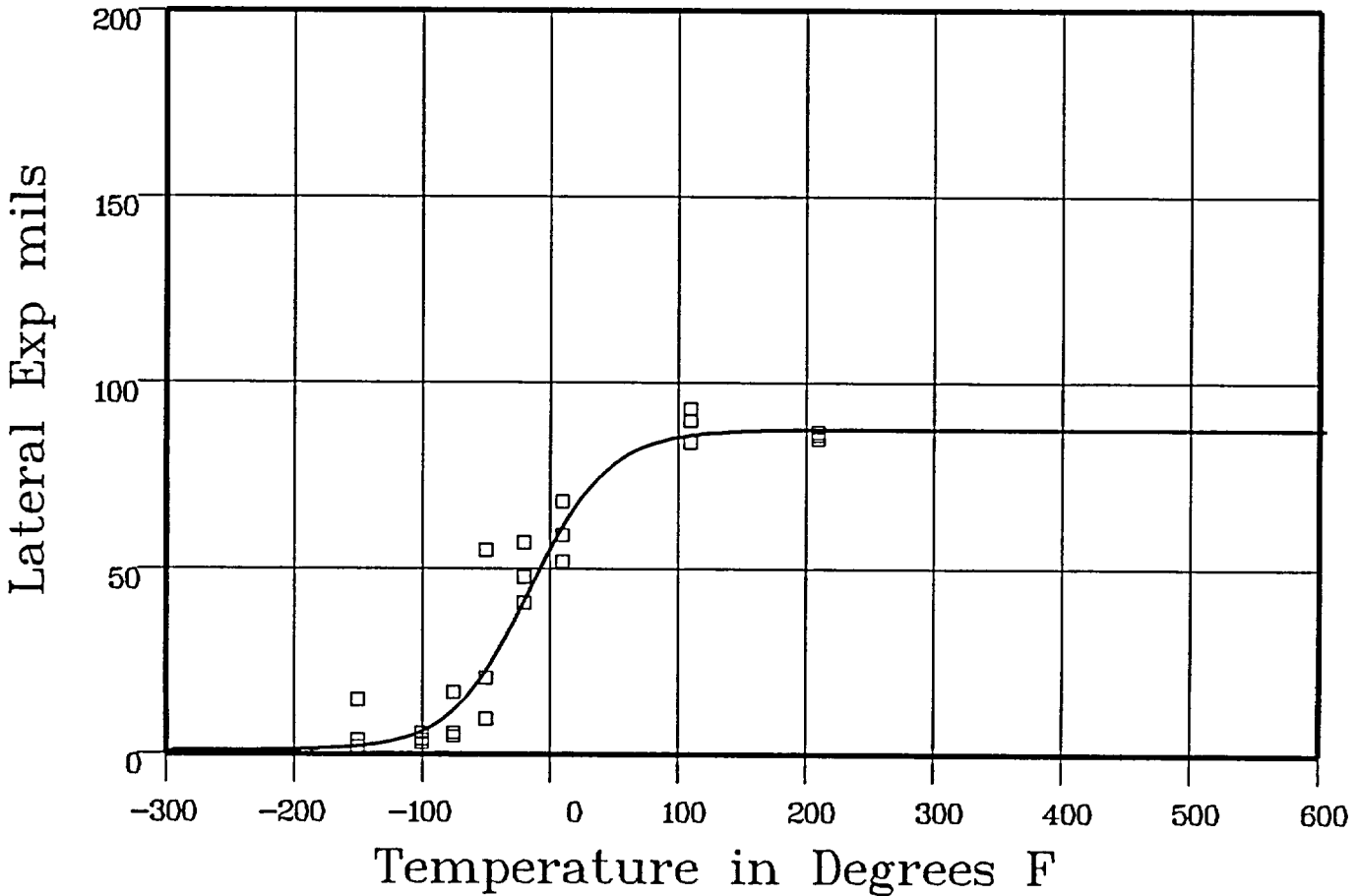
A = 44.32	B = 43.32	C = 62.87	T0 = -20.62
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Equation is:  $LE = A + B * [ \tanh((T - T0)/C) ]$

Upper Shelf LE: 87.64      Temperature at LE 35: -34.3      Lower Shelf LE: 1 Fixed

Material: FORGING SA5082      Heat Number: 123P461VA-1      Orientation: LT

Capsule: UNIRR      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: UNIRR    Material: FORGING SA5082    Ori: LT    Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-150	4	2.39	16
-150	2	2.39	-39
-150	15	2.39	126
-100	3	7.42	-4.42
-100	6	7.42	-1.42
-100	4	7.42	-3.42
-75	5	14.05	-9.05
-75	17	14.05	2.94
-75	6	14.05	-8.05

\*\*\*\* Data continued on next page \*\*\*\*

# UNIRR INTER SHELL FORGING 123P461VA-1(TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed LE	Differential
-50	10	25.43	-15.43
-50	21	25.43	-4.43
-50	55	25.43	29.56
-20	41	44.75	-3.75
-20	57	44.75	12.24
-20	48	44.75	3.24
10	59	63.9	-4.9
10	68	63.9	4.09
10	52	63.9	-11.9
110	93	86.3	6.69
110	90	86.3	3.69
110	84	86.3	-2.3
210	85	87.59	-2.59
210	86	87.59	-1.59
210	87	87.59	-5.9
SUM of RESIDUALS =			2.41

# CAPSULE S INTER SHELL FORGING 123P461VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 15:25:22 on 06-14-2002

Page 1

Coefficients of Curve 2

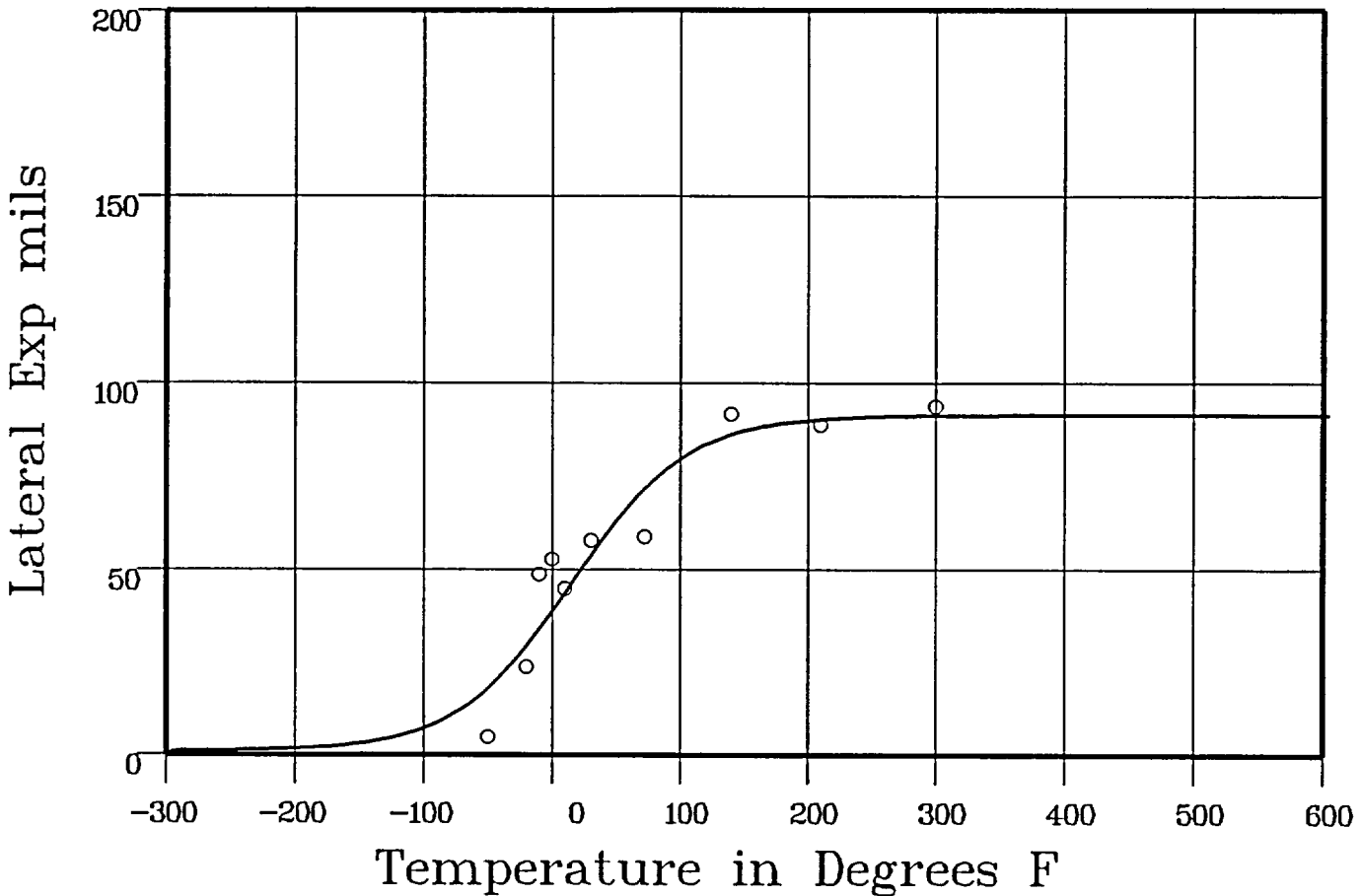
A = 463	B = 453	C = 89.46	T0 = 10.31
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 91.61      Temperature at LE 35: -12.4      Lower Shelf LE: 1 Fixed

Material: FORGING SA5082      Heat Number: 123P461VA-1      Orientation: LT

Capsule: S      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: S    Material: FORGING SA5082    Ori: LT    Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-50	5	19.68	-14.68
-20	24	31.51	-7.51
-10	49	36.19	12.8
0	53	41.1	11.89
10	45	46.15	-1.15
30	58	56.12	1.87
72	59	73.38	-14.38
140	92	86.88	5.11

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE S INTER SHELL FORGING 123P461VA-1 (TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: S Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
210	89	90.58	-1.58
300	94	91.47	2.52

SUM of RESIDUALS = -5.11

# CAPSULE T INTER SHELL FORGING 123P461VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 15:25:22 on 06-14-2002

Page 1

Coefficients of Curve 3

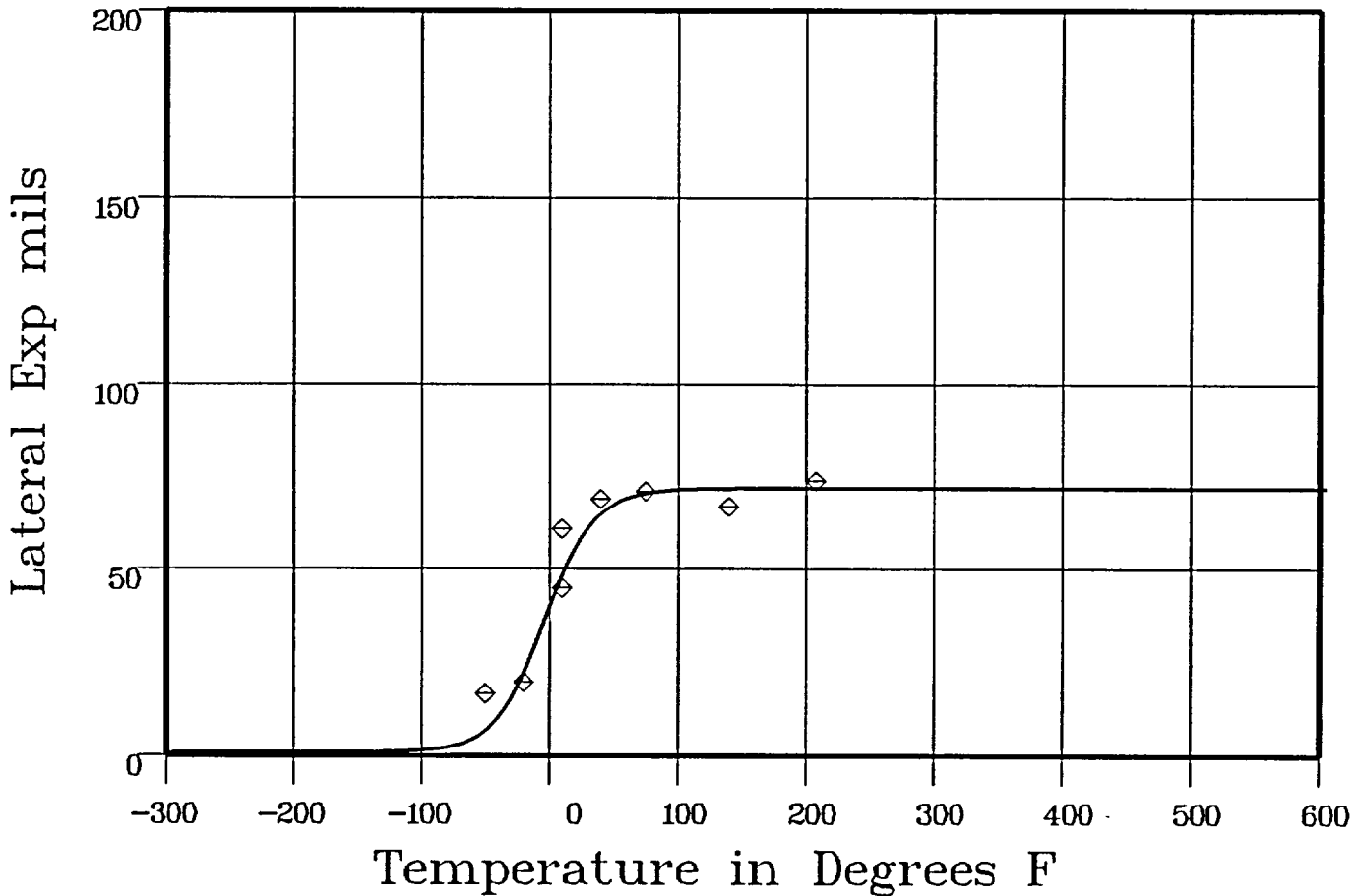
A = 36.42	B = 35.42	C = 39.15	T0 = -8.43
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 71.85      Temperature at LE 35: -10      Lower Shelf LE: 1 Fixed

Material: FORGING SA5082      Heat Number: 123P461VA-1      Orientation: LT

Capsule: T      Total Fluence:



Data Set(s) Plotted

Plant: TP3      Cap: T      Material: FORGING SA5082      Ori: LT      Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-50	17	8.57	8.42
-20	20	26.25	-6.25
10	61	51.97	9.02
10	45	51.97	-6.97
40	69	66.34	2.65
75	71	70.86	.13
140	67	71.81	-4.81
208	74	71.85	2.14

SUM of RESIDUALS = 4.32

# UNIRR INTER SHELL FORGING 123P461VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 15:40:04 on 06-14-2002

Page 1

Coefficients of Curve 1

A = 50	B = 50	C = 63.06	T0 = 2061
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 20.6

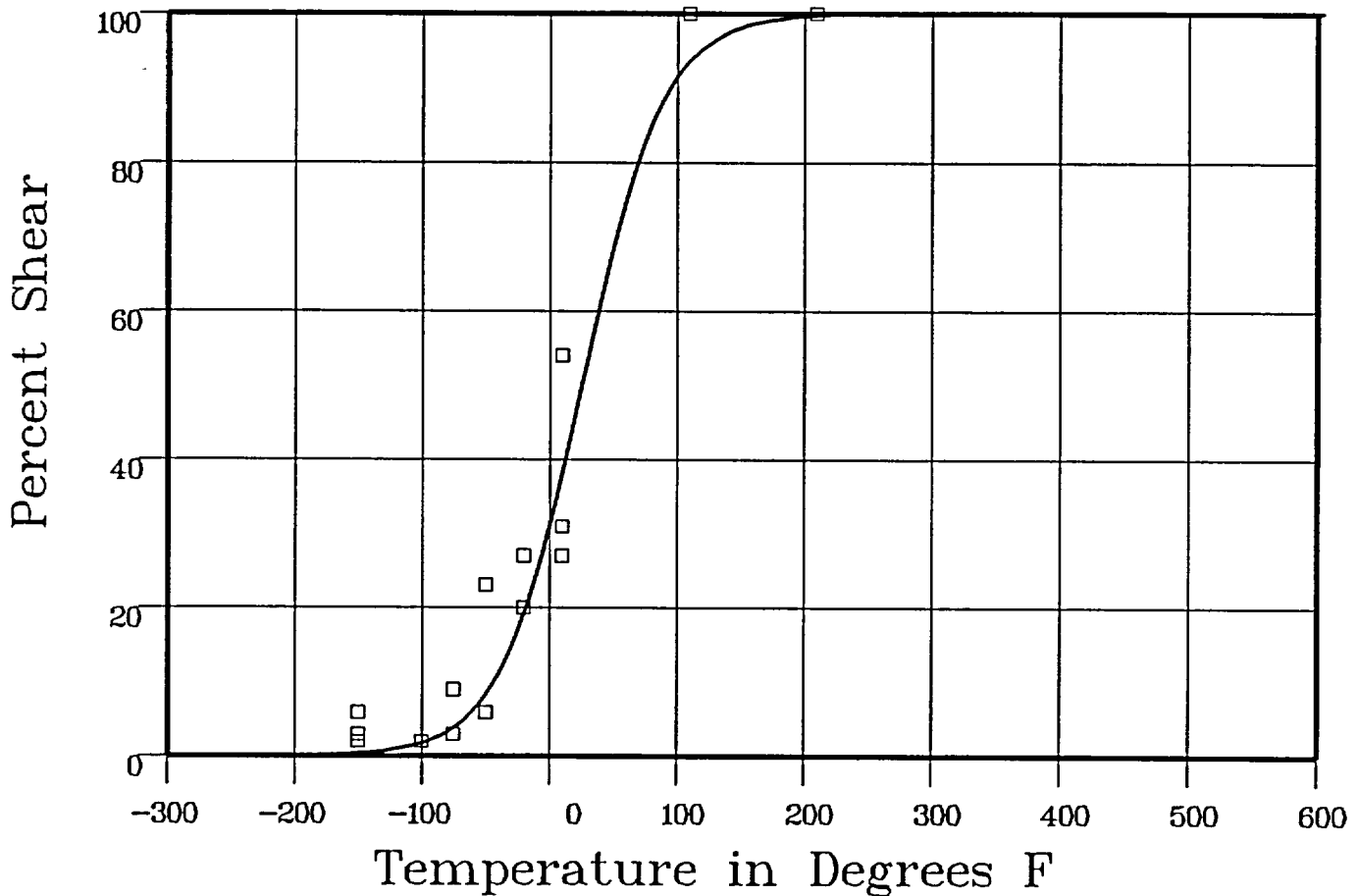
Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: UNIRR

Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: UNIRR

Material: FORGING SA5082

Ori: LT

Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-150	2	.44	1.56
-150	3	.44	2.56
-150	6	.44	5.56
-100	2	2.13	-1.13
-100	2	2.13	-1.13
-100	2	2.13	-1.13
-75	3	4.59	-1.59
-75	9	4.59	4.4
-75	3	4.59	-1.59

\*\*\*\* Data continued on next page \*\*\*\*

# UNIRR INTER SHELL FORGING 123P461VA-1(TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-50	6	9.62	-3.62
-50	6	9.62	-3.62
-50	23	9.62	13.37
-20	20	21.61	-1.61
-20	27	21.61	5.38
-20	27	21.61	5.38
10	27	41.65	-14.65
10	54	41.65	12.34
10	31	41.65	-10.65
110	100	94.45	5.54
110	100	94.45	5.54
110	100	94.45	5.54
210	100	99.75	24
210	100	99.75	24
210	100	99.75	24

SUM of RESIDUALS = 30.15

# CAPSULE S INTER SHELL FORGING 123P461VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 15:40:04 on 06-14-2002

Page 1

Coefficients of Curve 2

A = 50	B = 50	C = 130.47	T0 = 10.78
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 10.7

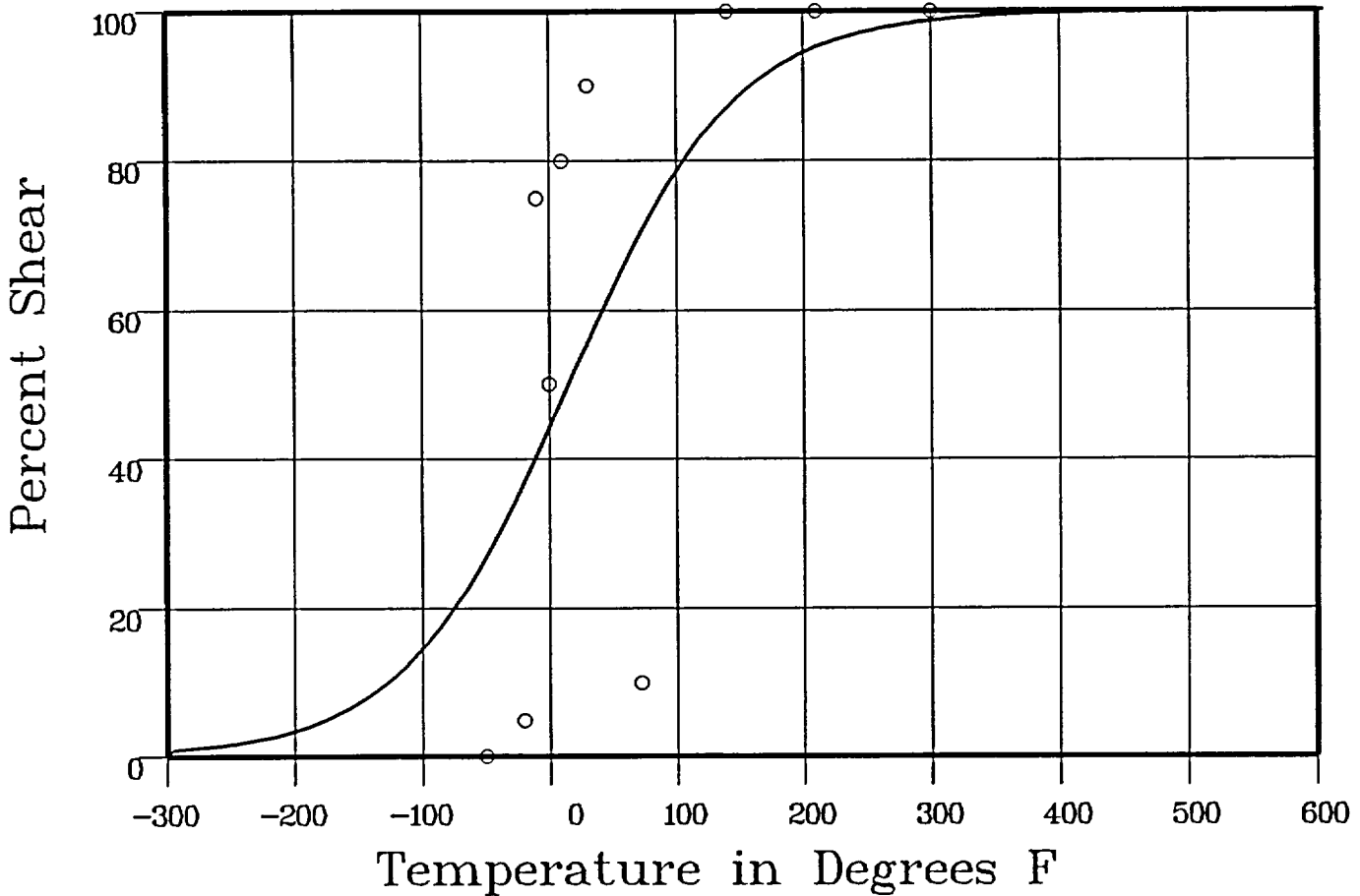
Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: S

Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: S

Material: FORGING SA5082

Ori: LT

Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-50	0	28.25	-28.25
-20	5	38.41	-33.41
-10	75	42.1	32.89
0	50	45.87	4.12
10	80	49.7	30.29
30	90	57.31	32.68
72	10	71.87	-61.87
140	100	87.87	12.12

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE S INTER SHELL FORGING 123P461VA-1 (TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: S      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
210	100	95.49	4.5
300	100	98.82	1.17

SUM of RESIDUALS = -5.74

# CAPSULE T INTER SHELL FORGING 123P461VA-1 (TANG)

CVGRAPH 41 Hyperbolic Tangent Curve Printed at 15:40:04 on 06-14-2002

Page 1

Coefficients of Curve 3

A = 50	B = 50	C = 45.06	T0 = 30
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T0)/C) ]$

Temperature at 50% Shear: 30

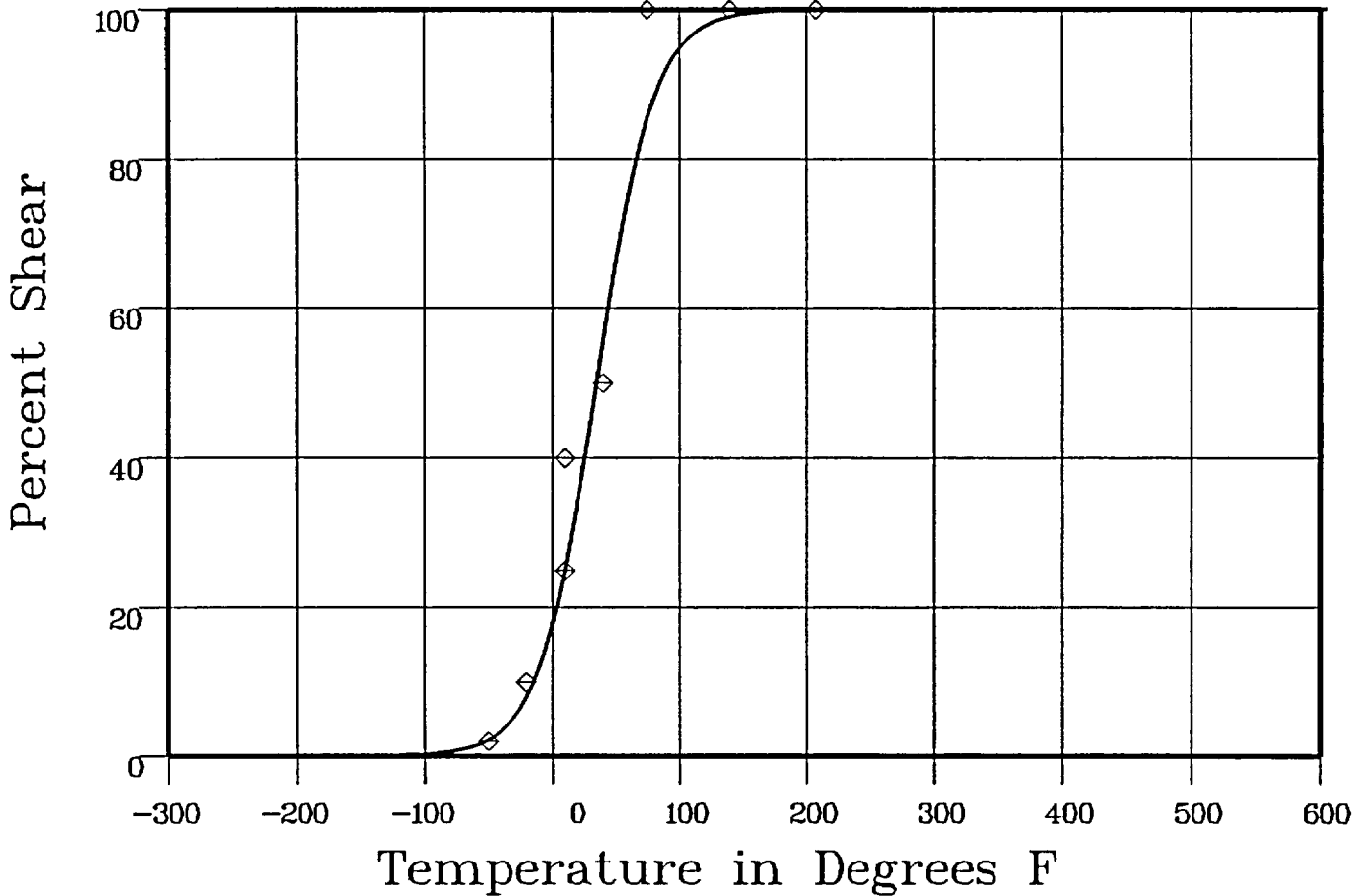
Material: FORGING SA5082

Heat Number: 123P461VA-1

Orientation: LT

Capsule: T

Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: T

Material: FORGING SA5082

Ori: LT

Heat #: 123P461VA-1

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-50	2	2.79	-.79
-20	10	9.8	.19
10	40	29.16	10.83
10	25	29.16	-4.16
40	50	60.91	-10.91
75	100	88.04	11.95
140	100	99.24	.75
208	100	99.96	.03

SUM of RESIDUALS = 7.9

# UNIRR LOWER SHELL FORGING 123S266VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 11:34:36 on 06-17-2002

Page 1

Coefficients of Curve 1

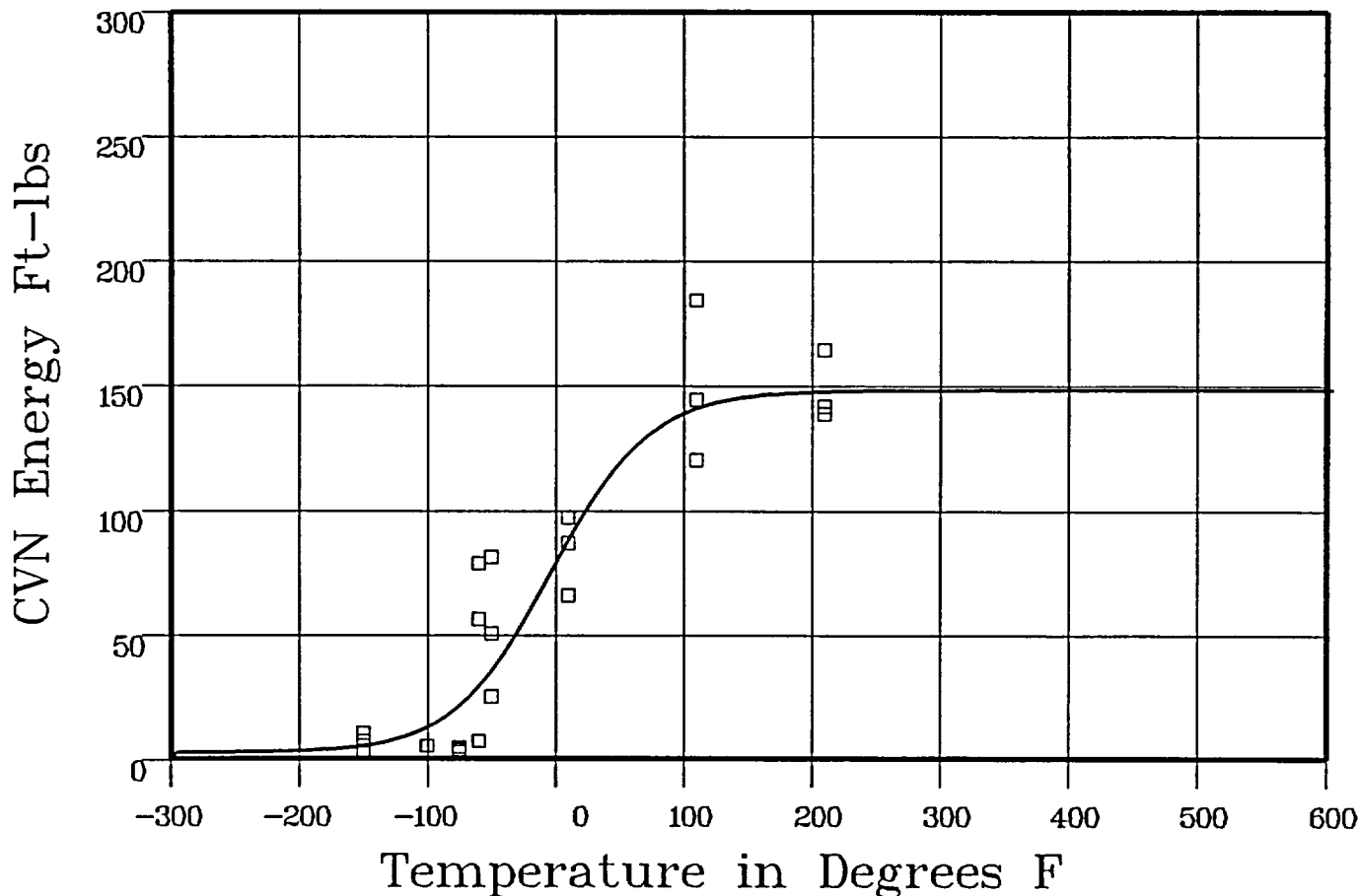
A = 75.09	B = 72.9	C = 76.55	T0 = -7.96
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 148 Fixed    Temp at 30 ft-lbs: -63.3    Temp. at 50 ft-lbs: -35.4    Lower Shelf Energy: 2.19 Fixed

Material: FORGING SA5082    Heat Number: 123S266VA-1    Orientation: LT

Capsule: UNIRR    Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: UNIRR    Material: FORGING SA5082    Ori: LT    Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-150	10.5	5.68	4.81
-150	3	5.68	-2.68
-150	7	5.68	1.31
-100	5	14.27	-9.27
-100	5	14.27	-9.27
-100	5	14.27	-9.27
-75	2.5	23.76	-21.26
-75	4.5	23.76	-19.26
-75	3.5	23.76	-20.26

\*\*\*\* Data continued on next page \*\*\*\*

# UNIRR LOWER SHELL FORGING 123S266VA-1 (TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-60	78.5	31.99	46.5
-60	7	31.99	-24.99
-60	56	31.99	24
-50	50	38.66	11.33
-50	25	38.66	-13.66
-50	81	38.66	42.33
10	86.5	91.9	-5.4
10	65.5	91.9	-26.4
10	97	91.9	5.09
110	184	141.6	42.39
110	144	141.6	2.39
110	120	141.6	-21.6
210	164	147.51	16.48
210	141.5	147.51	-6.01
210	138.5	147.51	-9.01
			SUM of RESIDUALS = -1.7

# CAPSULE S LOWER SHELL FORGING 123S266VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 11:34:36 on 06-17-2002

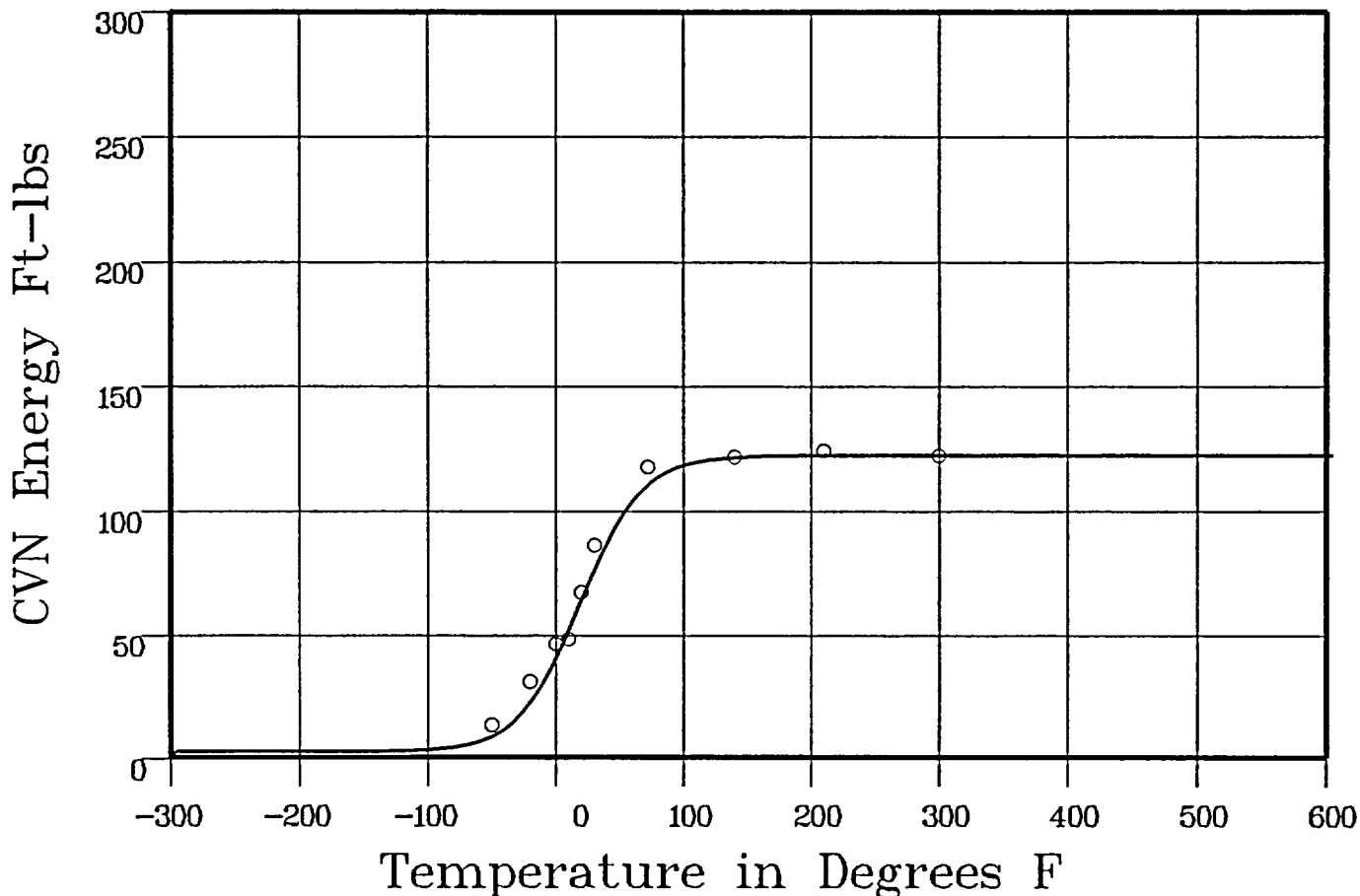
Page 1

Coefficients of Curve 2

A = 62.09	B = 59.9	C = 48.14	T0 = 14.06
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 122 Fixed    Temp. at 30 ft-lbs: -14.7    Temp. at 50 ft-lbs: 4.2    Lower Shelf Energy: 2.19 Fixed  
 Material: FORGING SA5082    Heat Number: 123S266VA-1    Orientation: LT  
 Capsule: S    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: S    Material: FORGING SA5082    Ori: LT    Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-50	135	10.02	3.47
-20	31	25.61	5.38
0	46	45.08	.91
10	48	57.05	-9.05
20	67	69.44	-2.44
30	86	81.23	4.76
72	117.5	112.09	5.4
140	121.5	121.36	.13

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE S LOWER SHELL FORGING 123S266VA-1 (TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: S Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input CVN Energy	Computed CVN Energy	Differential
210	124	121.96	2.03
300	122	121.99	0

SUM of RESIDUALS = 106

# CAPSULE V LOWER SHELL FORGING 123S266VA-1(TANG)

CVGRAPH 41 Hyperbolic Tangent Curve Printed at 11:34:36 on 06-17-2002

Page 1

Coefficients of Curve 3

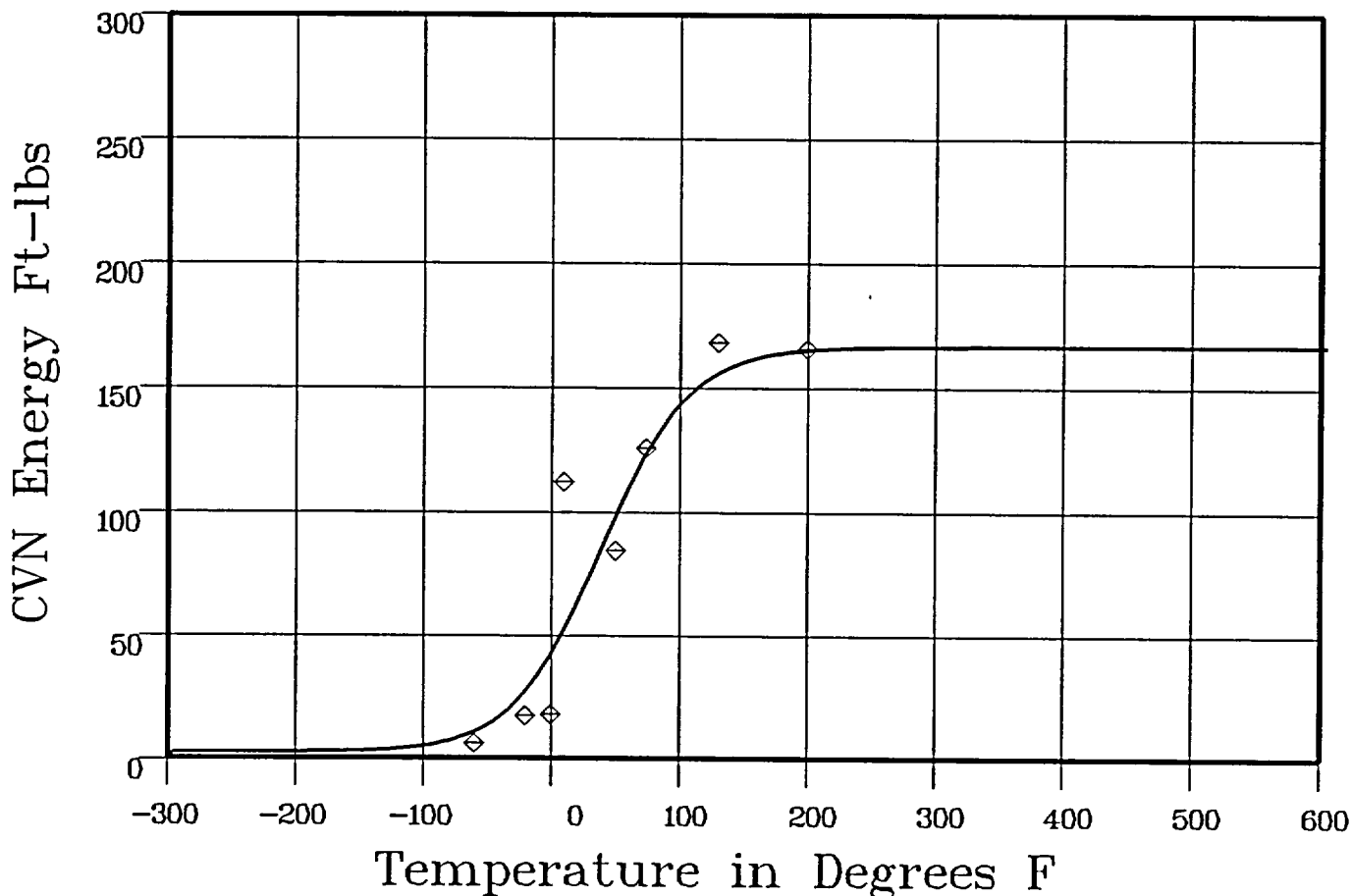
A = 84.34	B = 82.15	C = 68.59	T0 = 33.95
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Equation is:  $CVN = A + B * | \tanh((T - T_0)/C) |$

Upper Shelf Energy: 166.5 Fixed    Temp. at 30 ft-lbs: -20.6    Temp. at 50 ft-lbs: 33    Lower Shelf Energy: 2.19 Fixed

Material: FORGING SA5082    Heat Number: 123S266VA-1    Orientation: LT

Capsule: V    Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: V    Material: FORGING SA5082    Ori: LT    Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-60	6	12.17	-6.17
-20	17.5	30.42	-12.92
0	18	46.71	-28.71
10	112	56.77	55.22
50	84	103.22	-19.22
74	125.5	127.51	-2.01
130	168	157.08	10.91
200	165.5	165.21	.28

SUM of RESIDUALS = -2.62

# CAPSULE X LOWER SHELL FORGING 123S266VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 11:34:36 on 06-17-2002

Page 1

Coefficients of Curve 4

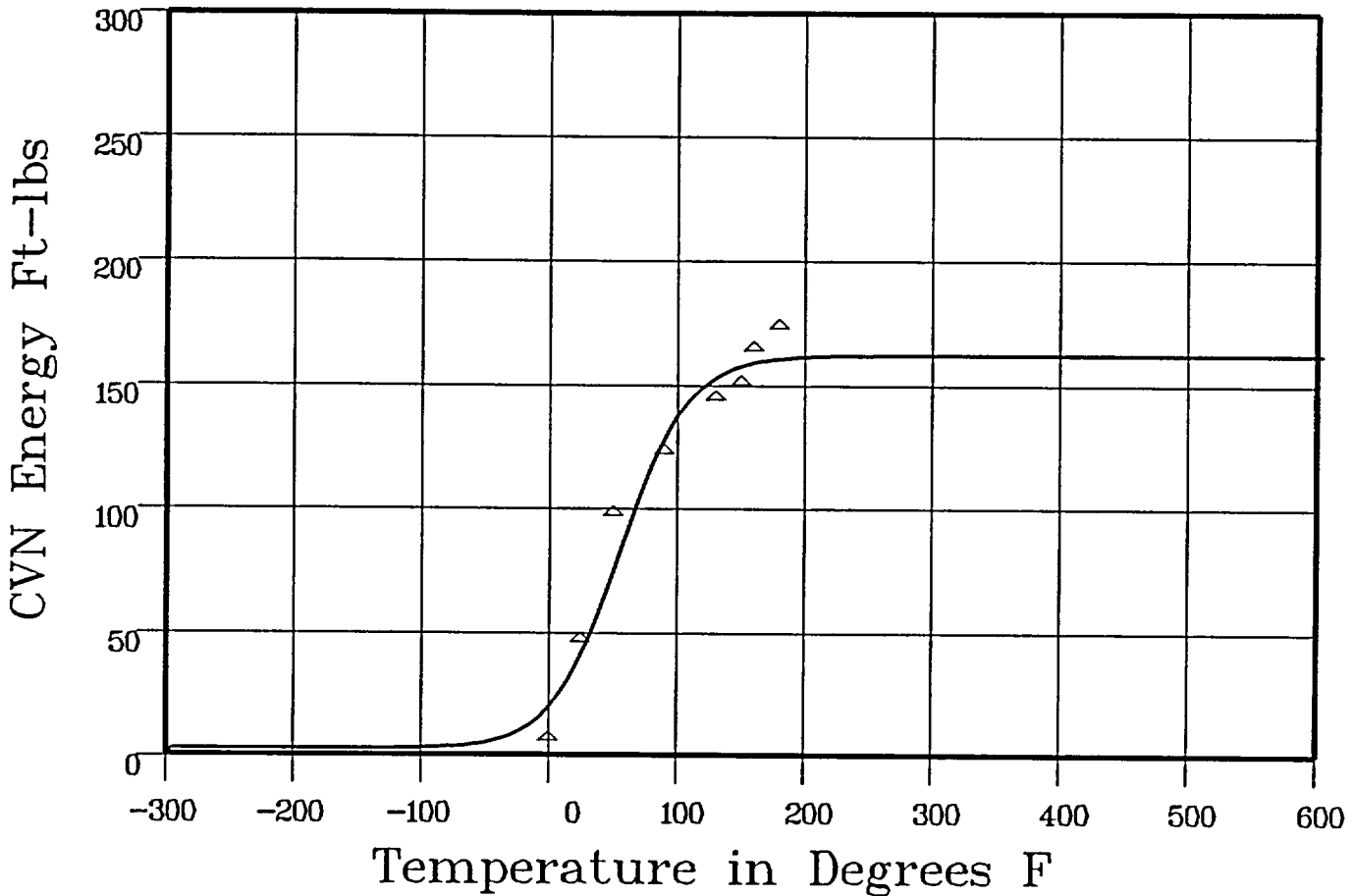
A = 82.09	B = 79.9	C = 53.25	T0 = 50.62
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 162 Fixed    Temp. at 30 ft-lbs: 9.1    Temp. at 50 ft-lbs: 27.9    Lower Shelf Energy: 2.19 Fixed

Material: FORGING SA5082    Heat Number: 123S266VA-1    Orientation: LT

Capsule: X    Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: X    Material: FORGING SA5082    Ori: LT    Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
0	6	22.97	-16.97
25	46	46.37	-37
50	97	81.16	15.83
90	122	132.33	-10.33
130	144	154.28	-10.28
150	150	158.26	-8.26
160	164	159.41	4.58

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE X LOWER SHELL FORGING 123S266VA-1(TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: X

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature  
180

Input CVN Energy  
173

Computed CVN Energy  
160.76

Differential  
12.23

SUM of RESIDUALS = -13.56

# UNIRR LOWER SHELL FORGING 123S266VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 12:03:10 on 06-17-2002

Page 1

Coefficients of Curve 1

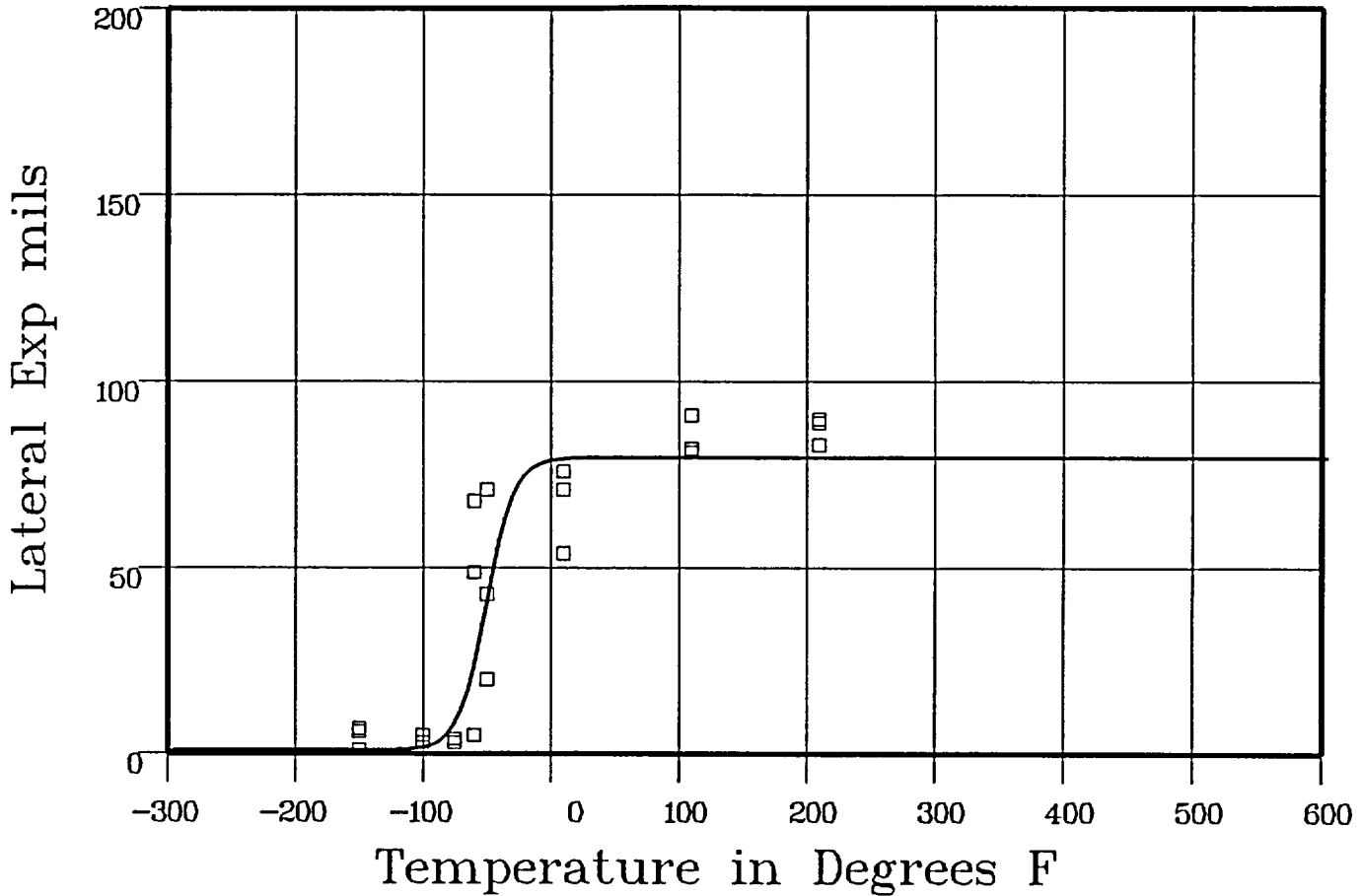
A = 4033	B = 3933	C = 2153	T0 = -55.31
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 79.67      Temperature at LE 35: -58.2      Lower Shelf LE: 1 Fixed

Material: FORGING SA5082      Heat Number: 123S266VA-1      Orientation: LT

Capsule: UNIRR      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3      Cap: UNIRR      Material: FORGING SA5082      Ori: LT      Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-150	7	101	5.98
-150	1	101	-.01
-150	6	101	4.98
-100	5	222	2.77
-100	5	222	2.77
-100	3	222	.77
-75	3	11.89	-8.89
-75	4	11.89	-7.89
-75	4	11.89	-7.89

\*\*\*\* Data continued on next page \*\*\*\*

# UNIRR LOWER SHELL FORGING 123S266VA-1 (TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
-60	68	31.9	36.09
-60	5	31.9	-26.9
-60	49	31.9	17.09
-50	43	49.84	-6.84
-50	20	49.84	-29.84
-50	71	49.84	21.15
10	71	79.48	-8.48
10	54	79.48	-25.48
10	76	79.48	-3.48
110	81	79.67	1.32
110	91	79.67	11.32
110	82	79.67	2.32
210	83	79.67	3.32
210	90	79.67	10.32
210	89	79.67	9.32
SUM of RESIDUALS =			386

# CAPSULE S LOWER SHELL FORGING 123S266VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 12:03:10 on 06-17-2002

Page 1

Coefficients of Curve 2

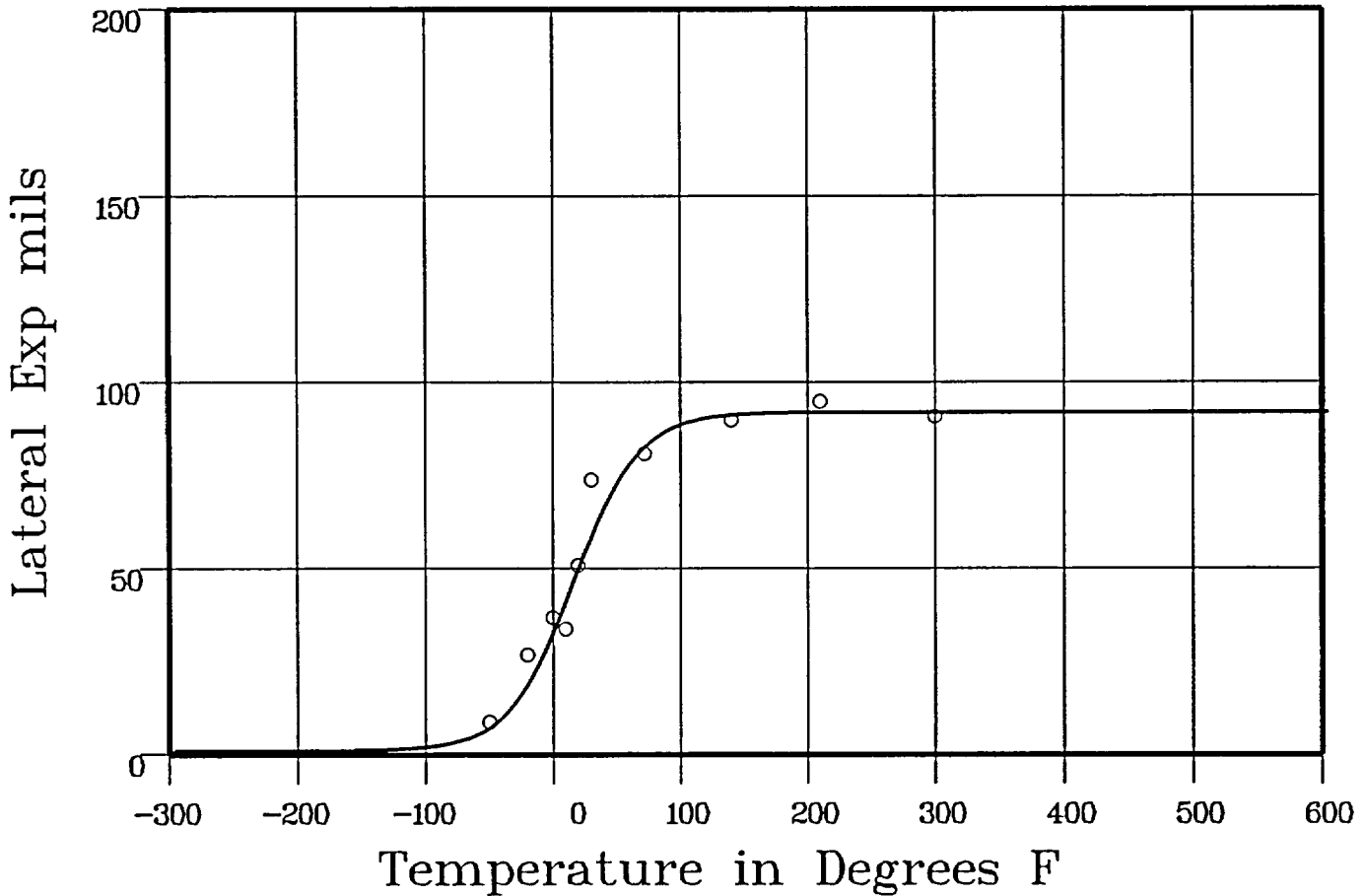
A = 46.52	B = 45.52	C = 51.36	T0 = 11.71
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Equation is  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 92.04      Temperature at LE 35: -15      Lower Shelf LE: 1 Fixed

Material: FORGING SA5082      Heat Number: 123S266VA-1      Orientation: LT

Capsule: S      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: S    Material: FORGING SA5082    Ori: LT    Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-50	9	8.54	.45
-20	27	21.51	5.48
0	37	36.31	.68
10	34	44.99	-10.99
20	51	53.79	-2.79
30	74	62.07	11.92
72	81	84.09	-3.09
140	90	91.42	-1.42

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE S LOWER SHELL FORGING 123S266VA-1(TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: S Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
210	95	92	2.99
300	91	92.04	-1.04

SUM of RESIDUALS = 219

# CAPSULE V LOWER SHELL FORGING 123S266VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 12:03:10 on 06-17-2002

Page 1

Coefficients of Curve 3

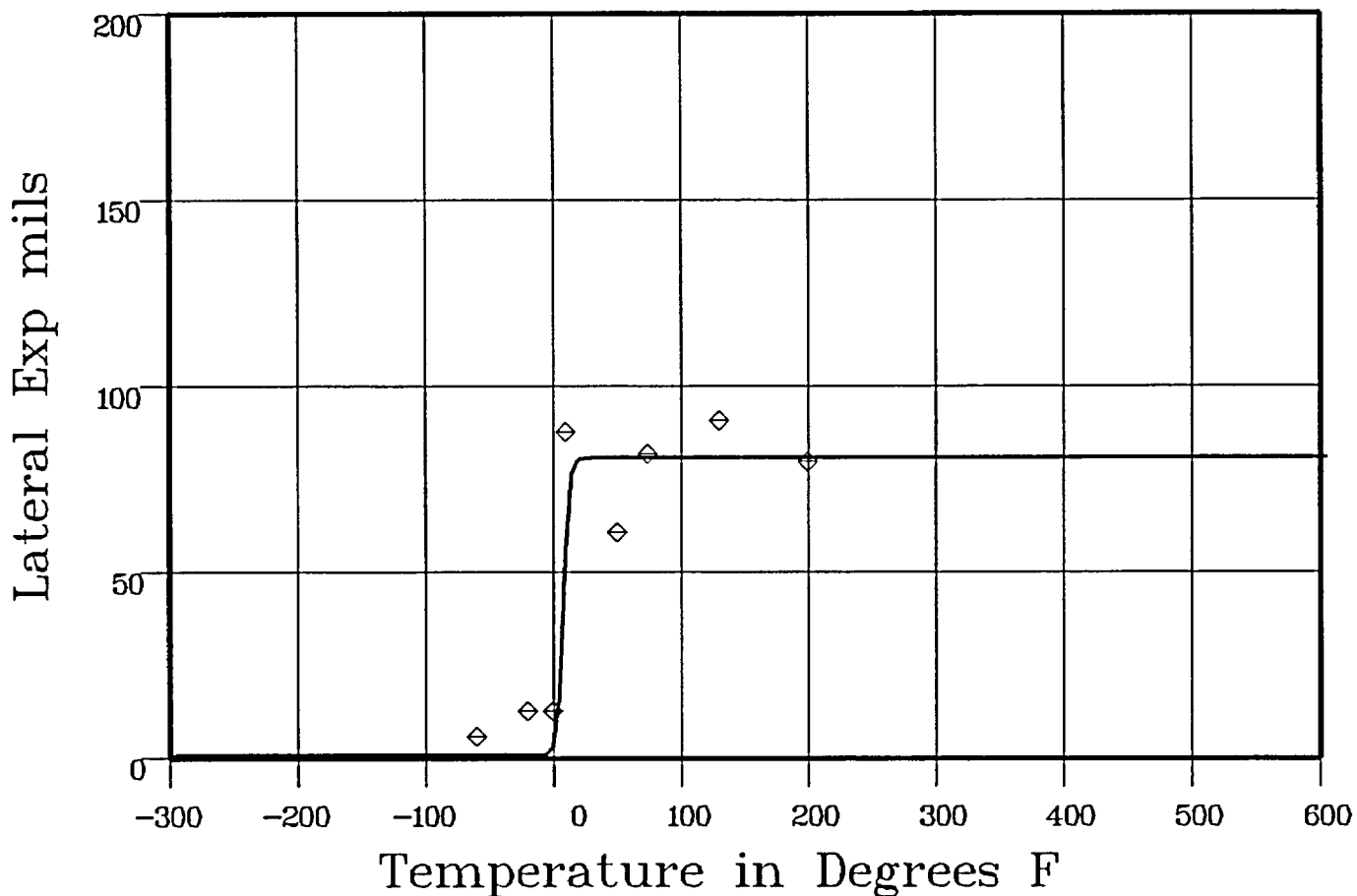
A = 40.99	B = 39.99	C = 4.63	T0 = 3.28
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 80.98      Temperature at LE 35: 25      Lower Shelf LE: 1 Fixed

Material: FORGING SA5082      Heat Number: 123S266VA-1      Orientation: LT

Capsule: V      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: V    Material: FORGING SA5082    Ori: LT    Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-60	6	1	5
-20	13	1	11.99
0	13	16.6	-3.6
10	88	76.82	11.17
50	61	80.98	-19.98
74	82	80.98	1.01
130	91	80.98	10.01
200	80	80.98	-9.98

SUM of RESIDUALS = 14.63

# CAPSULE X LOWER SHELL FORGING 123S266VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 12:03:10 on 06-17-2002

Page 1

Coefficients of Curve 4

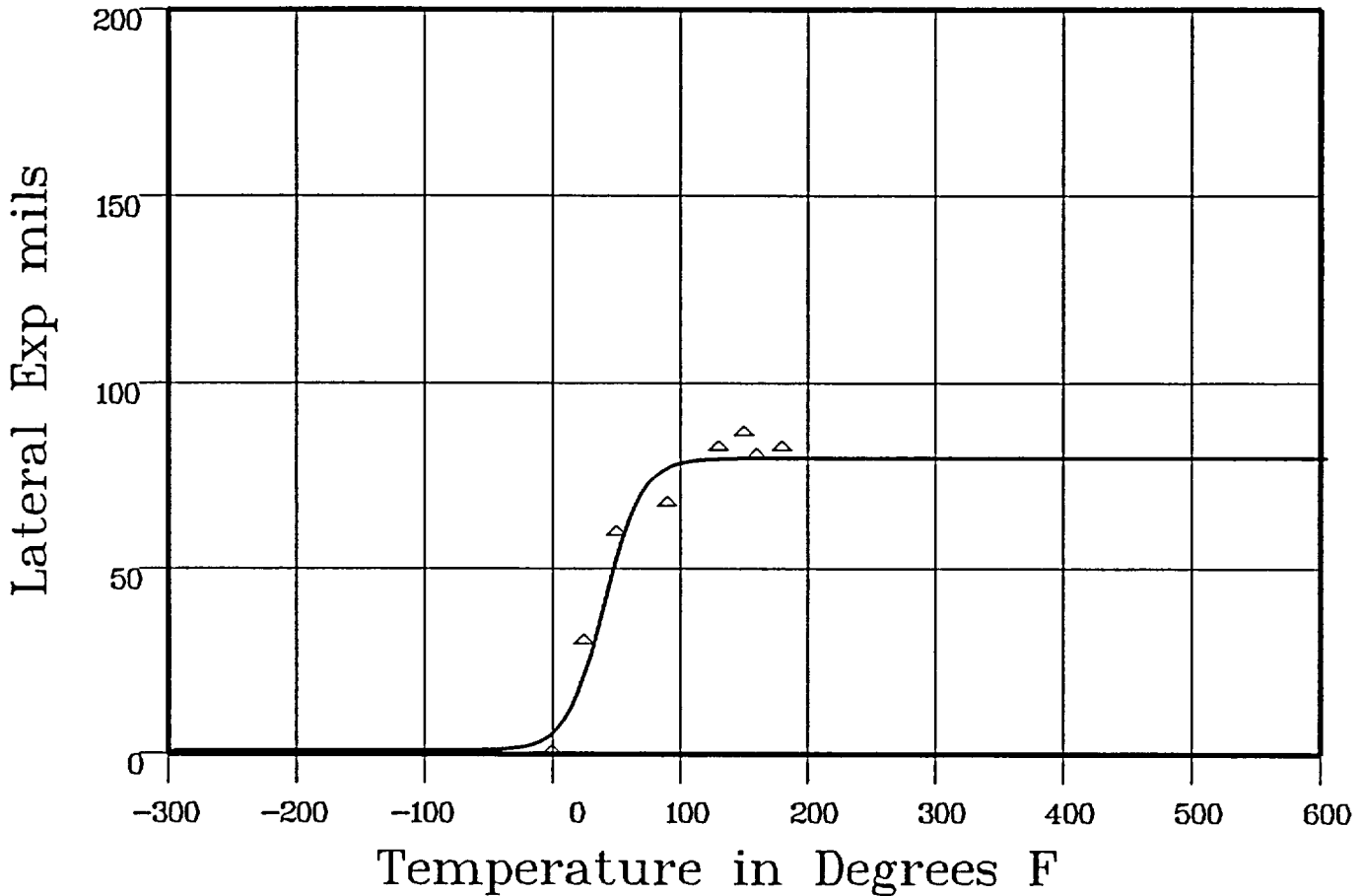
A = 40.4	B = 39.4	C = 29.33	T0 = 35.62
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 79.81      Temperature at LE 35: 315      Lower Shelf LE: 1 Fixed

Material: FORGING SA5082      Heat Number: 123S266VA-1      Orientation: LT

Capsule: X      Total Fluence:



Data Set(s) Plotted

Plant: TP3      Cap: X      Material: FORGING SA5082      Ori: LT      Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
0	0	7.38	-7.38
25	30	26.72	3.27
50	59	58.3	.69
90	67	77.92	-10.92
130	82	79.69	2.3
150	86	79.78	6.21
160	80	79.8	.19

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE X LOWER SHELL FORGING 123S266VA-1(TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: X

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature  
180

Input Lateral Expansion  
82

Computed L.E.  
7981

Differential  
2.18

SUM of RESIDUALS = -3.45

# UNIRR LOWER SHELL FORGING 123S266VA-1 (TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 12:17:43 on 06-17-2002

Page 1

Coefficients of Curve 1

A = 50	B = 50	C = 75.86	T0 = 13.12
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 131

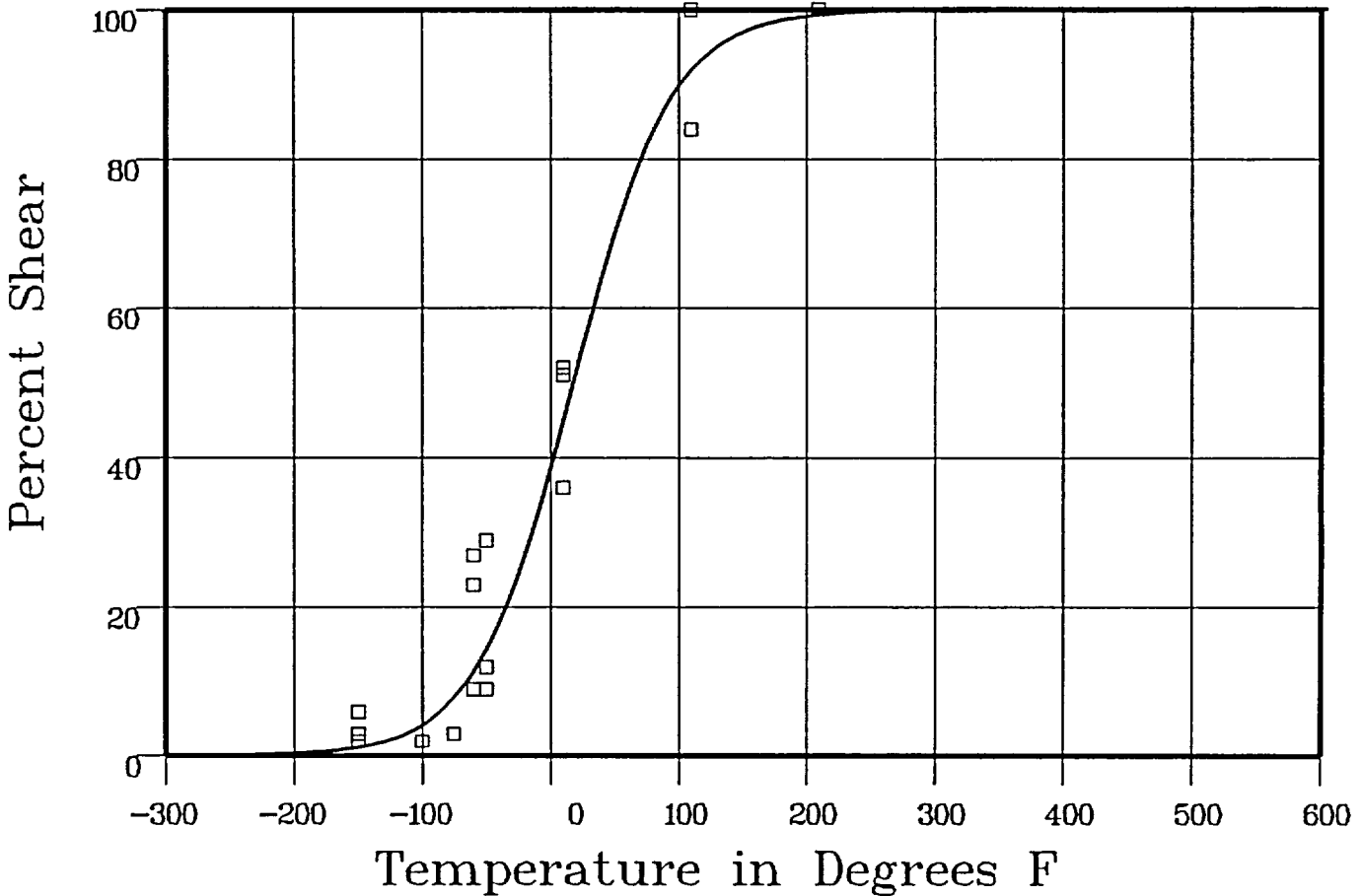
Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: UNIRR

Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: UNIRR

Material: FORGING SA5082

Ori: LT

Heat #: 123S266VA-1

## Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-150	6	1.33	4.66
-150	2	1.33	.66
-150	3	1.33	1.66
-100	2	4.82	-2.82
-100	2	4.82	-2.82
-100	2	4.82	-2.82
-75	3	8.92	-5.92
-75	3	8.92	-5.92
-75	3	8.92	-5.92

\*\*\*\* Data continued on next page \*\*\*\*

# UNIRR LOWER SHELL FORGING 123S266VA-1 (TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-60	27	12.7	14.29
-60	9	12.7	-3.7
-60	23	12.7	10.29
-50	12	15.92	-3.92
-50	9	15.92	-6.92
-50	29	15.92	13.07
10	52	47.94	4.05
10	36	47.94	-11.94
10	51	47.94	3.05
110	100	92.78	7.21
110	100	92.78	7.21
110	84	92.78	-8.78
210	100	99.44	.55
210	100	99.44	.55
210	100	99.44	.55

SUM of RESIDUALS = 6.36

# CAPSULE S LOWER SHELL FORGING 123S266VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 12:17:43 on 06-17-2002

Page 1

Coefficients of Curve 2

A = 50	B = 50	C = 4.88	T0 = 17.34
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Equation is:  $Shear\% = A + B * [ \tanh((T - T_0)/C) ]$

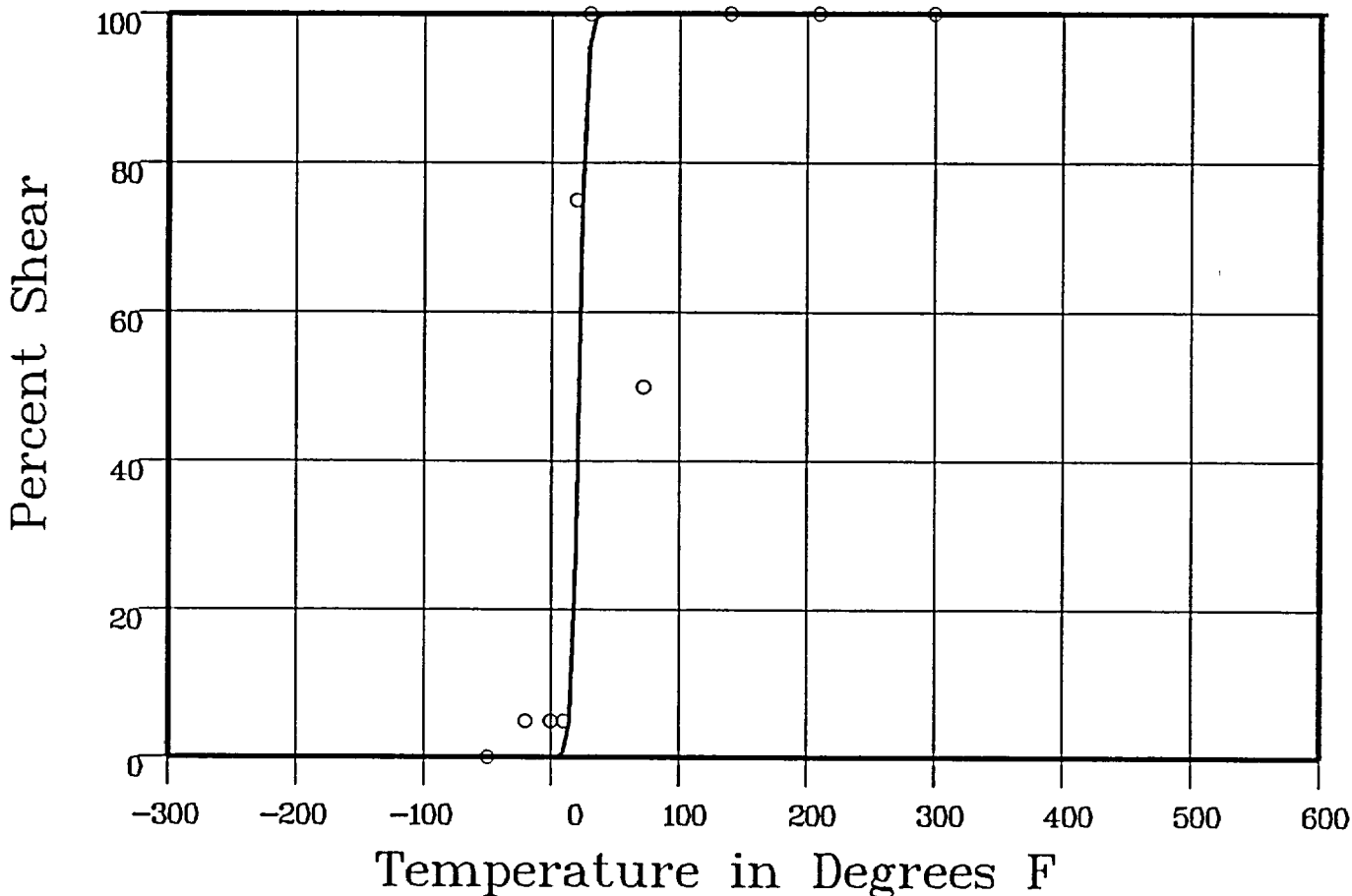
Temperature at 50% Shear: 17.3

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: S      Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: S

Material: FORGING SA5082

Ori: LT

Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-50	0	0	0
-20	5	0	4.99
0	5	.08	4.91
10	5	4.72	.27
20	75	74.77	.22
30	100	99.43	.56
72	50	100	-50
140	100	100	0

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE S LOWER SHELL FORGING 123S266VA-1(TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: S

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
210	100	100	0
300	100	100	0

SUM of RESIDUALS = -3901

# CAPSULE V LOWER SHELL FORGING 123S266VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 12:17:43 on 06-17-2002

Page 1

Coefficients of Curve 3

A = 50	B = 50	C = 59.06	T0 = 63.75
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Equation is  $Shear\% = A + B * [ \tanh((T - T_0)/C) ]$

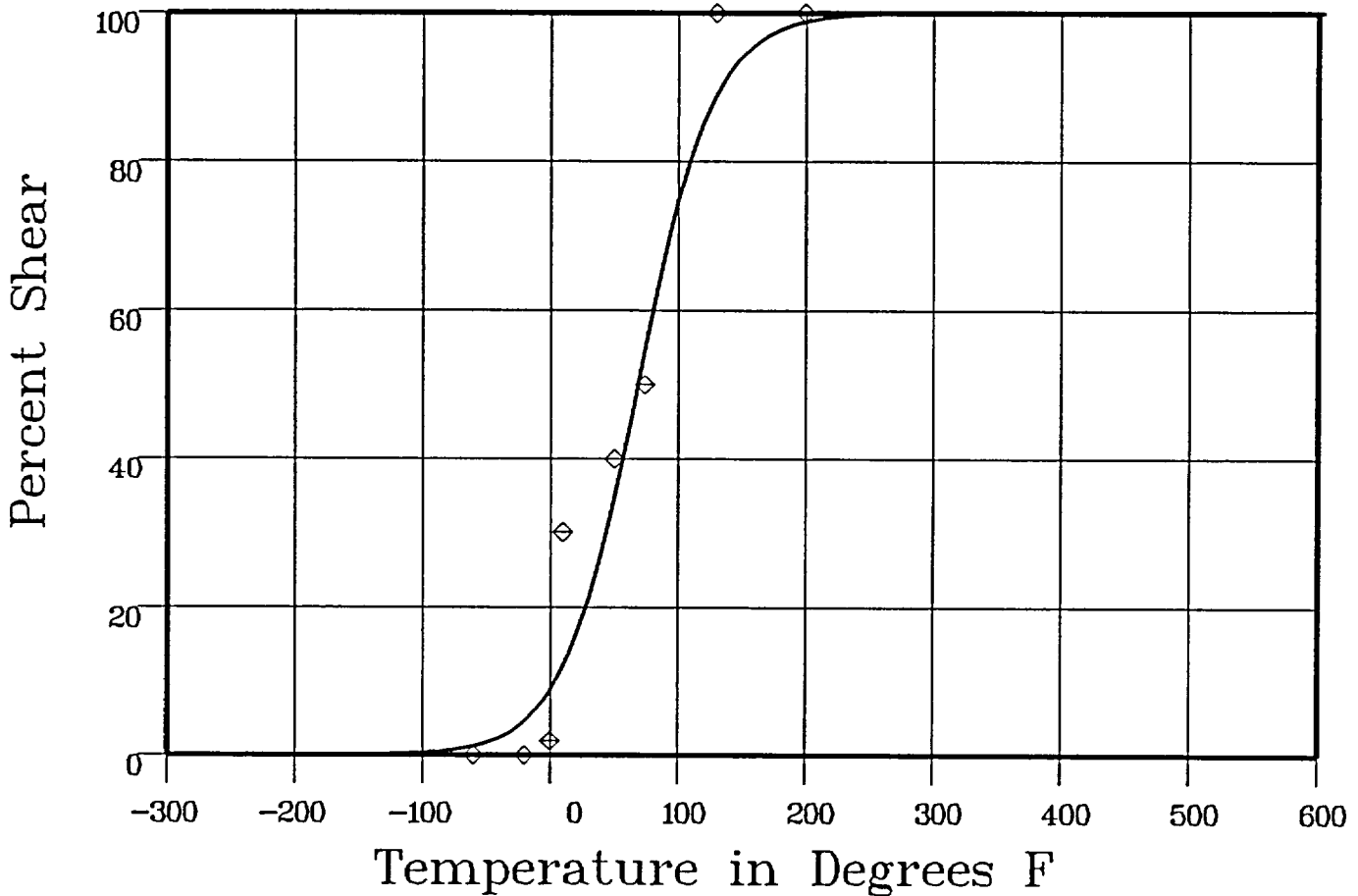
Temperature at 50% Shear: 63.7

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: V Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: V

Material: FORGING SA5082

Ori: LT

Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-60	0	1.49	-1.49
-20	0	5.54	-5.54
0	2	10.35	-8.35
10	30	13.94	16.05
50	40	38.56	1.43
74	50	58.59	-8.59
130	100	90.4	9.59
200	100	99.01	.98

SUM of RESIDUALS = 4.09

# CAPSULE X LOWER SHELL FORGING 123S266VA-1(TANG)

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 12:17:43 on 06-17-2002

Page 1

Coefficients of Curve 4

A = 50	B = 50	C = 44.62	T0 = 96.56
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 96.5

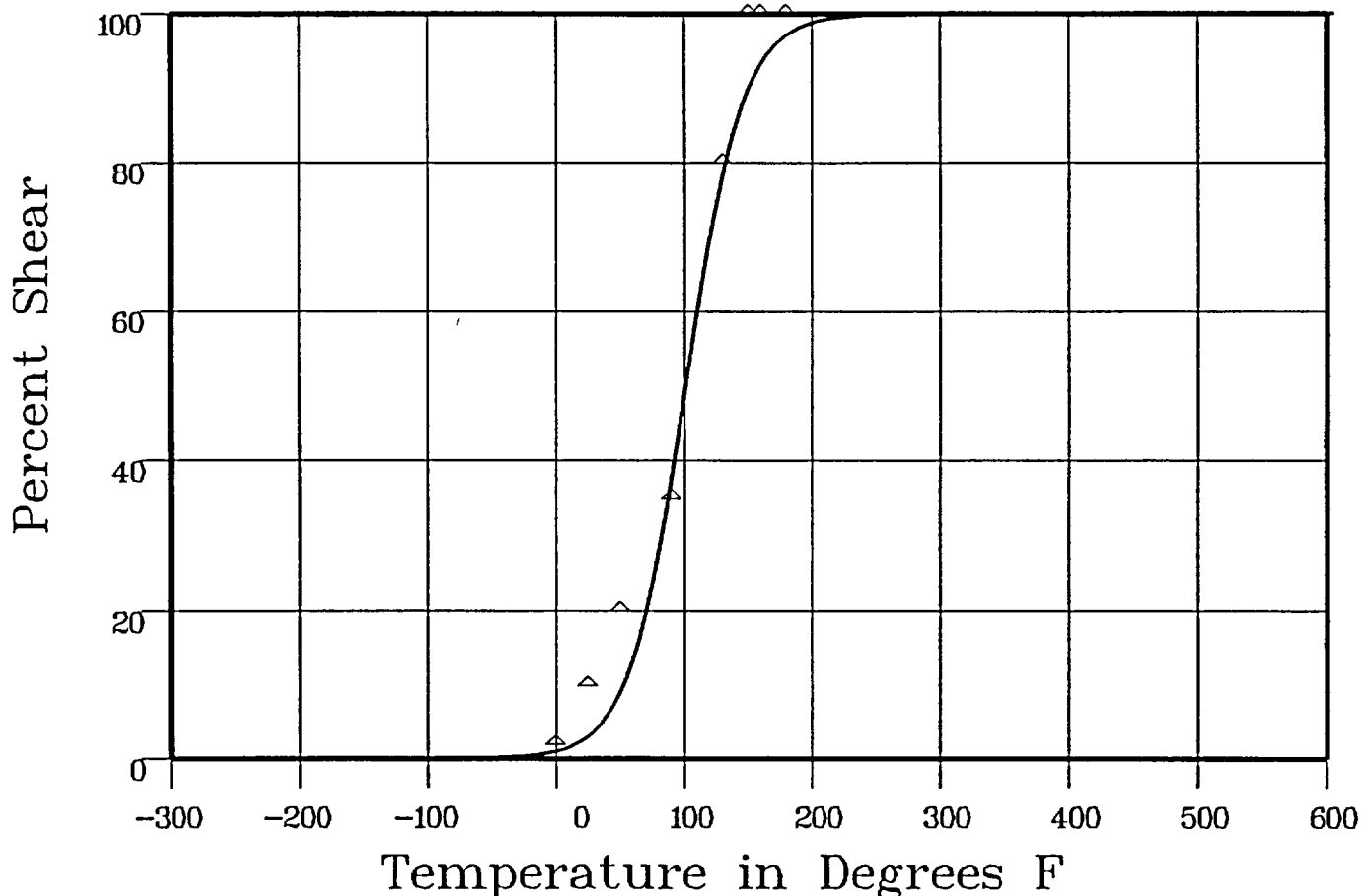
Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: X

Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: X    Material: FORGING SA5082    Ori: LT    Heat #: 123S266VA-1

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
0	2	13	.69
25	10	3.88	6.11
50	20	11.03	8.96
90	35	42.69	-7.69
130	80	81.73	-1.73
150	100	91.64	8.35
160	100	94.49	5.5

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE X LOWER SHELL FORGING 123S266VA-1(TANG)

Page 2

Material: FORGING SA5082

Heat Number: 123S266VA-1

Orientation: LT

Capsule: X

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature  
180

Input Percent Shear  
100

Computed Percent Shear  
97.67

Differential  
2.32

SUM of RESIDUALS = 22.51

# WELD METAL UNIRRADIATED

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 11:23:09 on 06-19-2002

Page 1

Coefficients of Curve 1

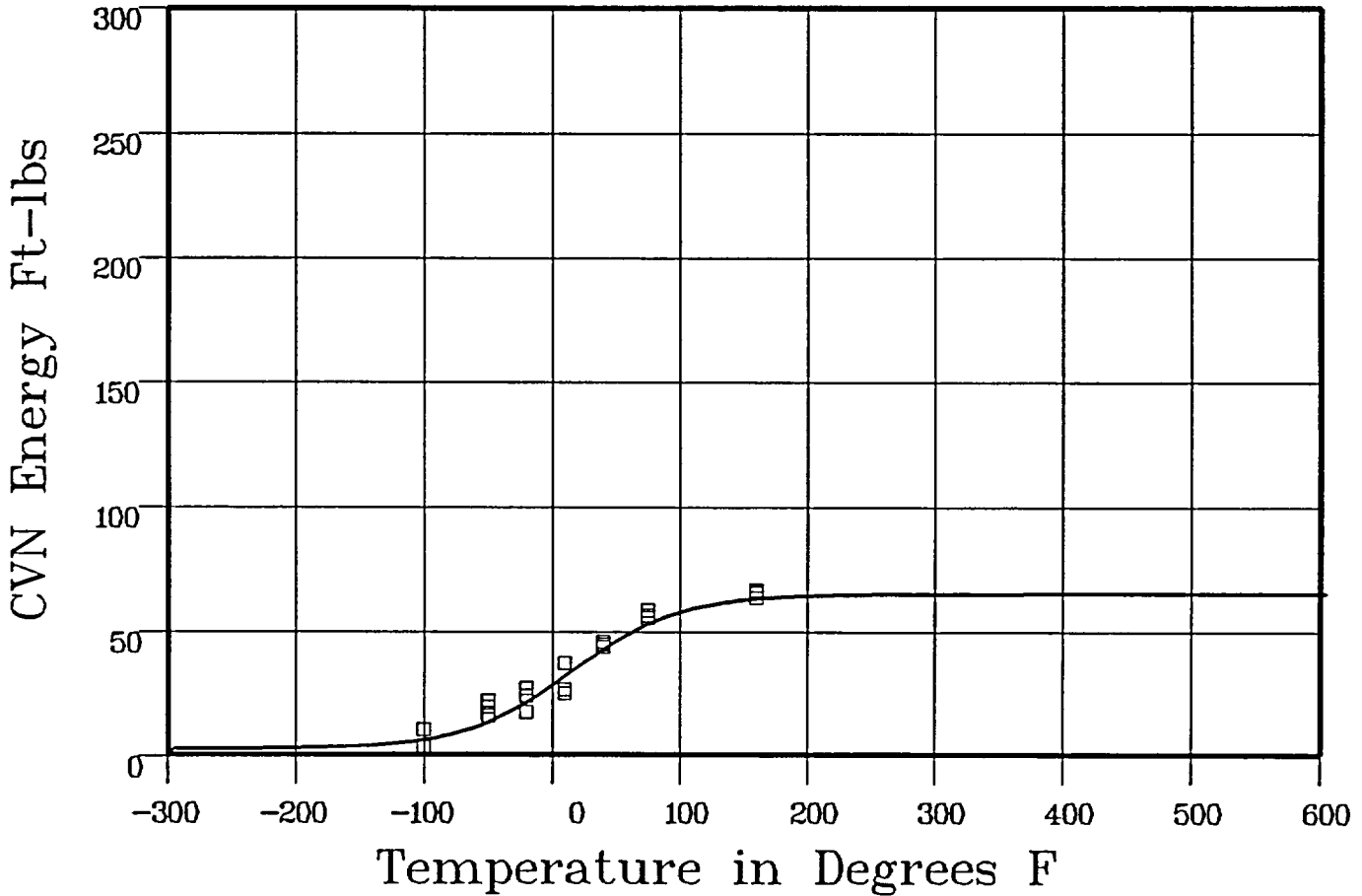
A = 33.44	B = 3124	C = 85.37	T0 = 9.37
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 64.69 Fixed    Temp. at 30 ft-lbs: 0    Temp. at 50 ft-lbs: 59.7    Lower Shelf Energy: 2.19 Fixed

Material: WELD LINDE 80    Heat Number: 71249    Orientation:

Capsule: UNIRR    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: UNIRR    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-100	10.5	6.67	3.82
-100	3	6.67	-3.67
-100	3	6.67	-3.67
-50	22	14.65	7.34
-50	19.5	14.65	4.84
-50	16	14.65	1.34
-20	24	23.1	.89
-20	27	23.1	3.89
-20	175	23.1	-5.6

\*\*\*\* Data continued on next page \*\*\*\*

# WELD METAL UNIRRADIATED

Page 2

Material: WELD LINDE 80

Heat Number: 71249

Orientation:

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input CVN Energy	Computed CVN Energy	Differential
10	37	33.67	3.32
10	25	33.67	-8.67
10	26.5	33.67	-7.17
40	45.5	44.2	1.29
40	43.5	44.2	-.7
40	44.5	44.2	.29
75	56	53.64	2.35
75	55	53.64	1.35
75	58	53.64	4.35
160	65	62.91	2.08
160	66	62.91	3.08
160	63	62.91	.08

SUM of RESIDUALS = 10.87

# WELD METAL CAPSULE T

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 11:23:09 on 06-19-2002

Page 1

Coefficients of Curve 2

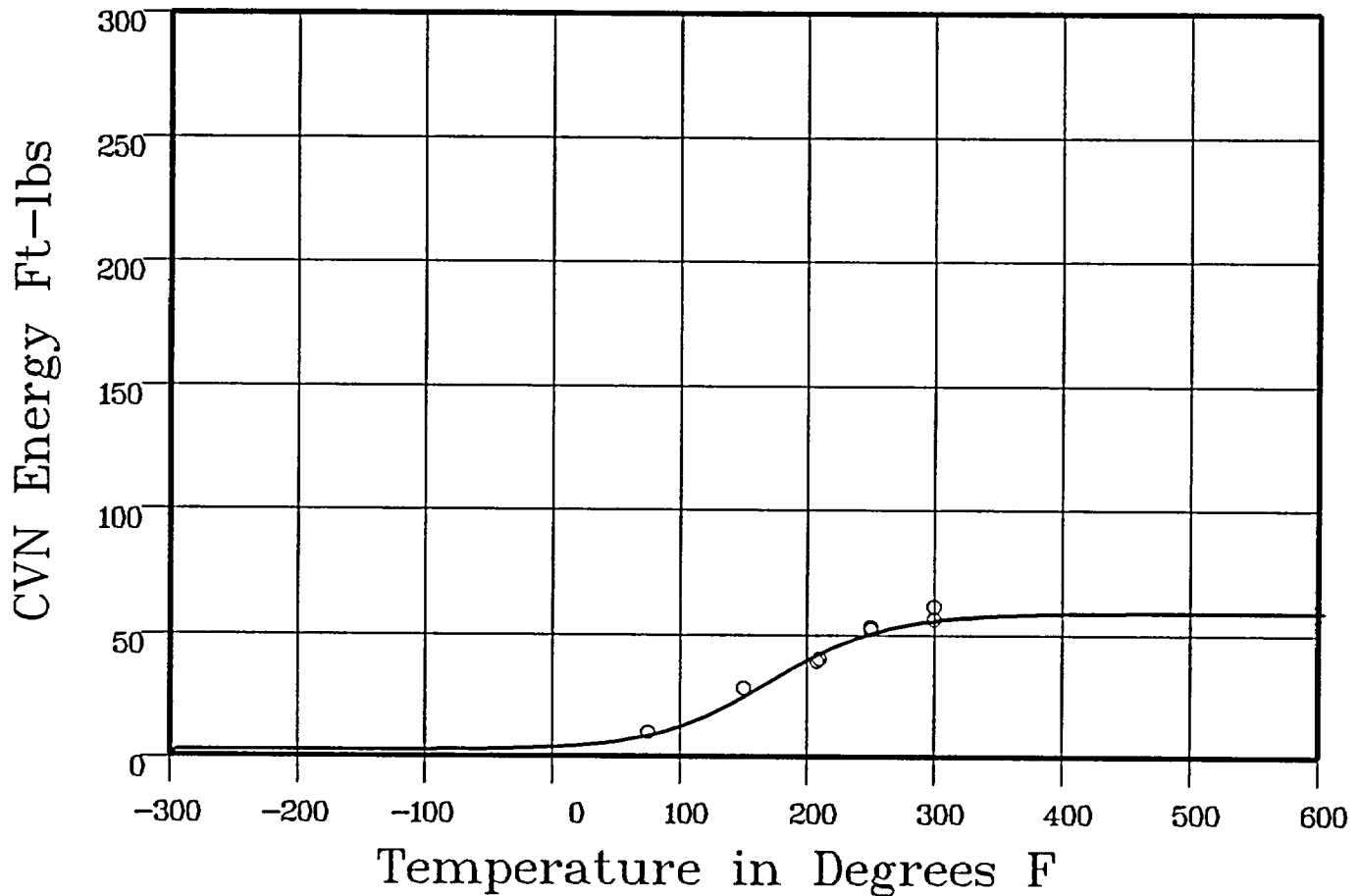
A = 30.35	B = 28.14	C = 92.71	T0 = 164.94
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Equation is:  $CVN = A + B * | \tanh((T - T_0)/C) |$

Upper Shelf Energy: 585 Fixed    Temp. at 30 ft-lbs: 163.7    Temp. at 50 ft-lbs: 244.9    Lower Shelf Energy: 2.2 Fixed

Material: WELD LINDE 80    Heat Number: 71249    Orientation:

Capsule: T    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
75	10	9.27	.72
150	28	25.85	2.14
208	39	42.55	-3.55
210	40	43.04	-3.04
250	53	50.74	2.25
250	52	50.74	1.25
300	61	55.6	5.39
300	56	55.6	.39

SUM of RESIDUALS = 5.56

# WELD METAL CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 11:23:09 on 06-19-2002

Page 1

Coefficients of Curve 3

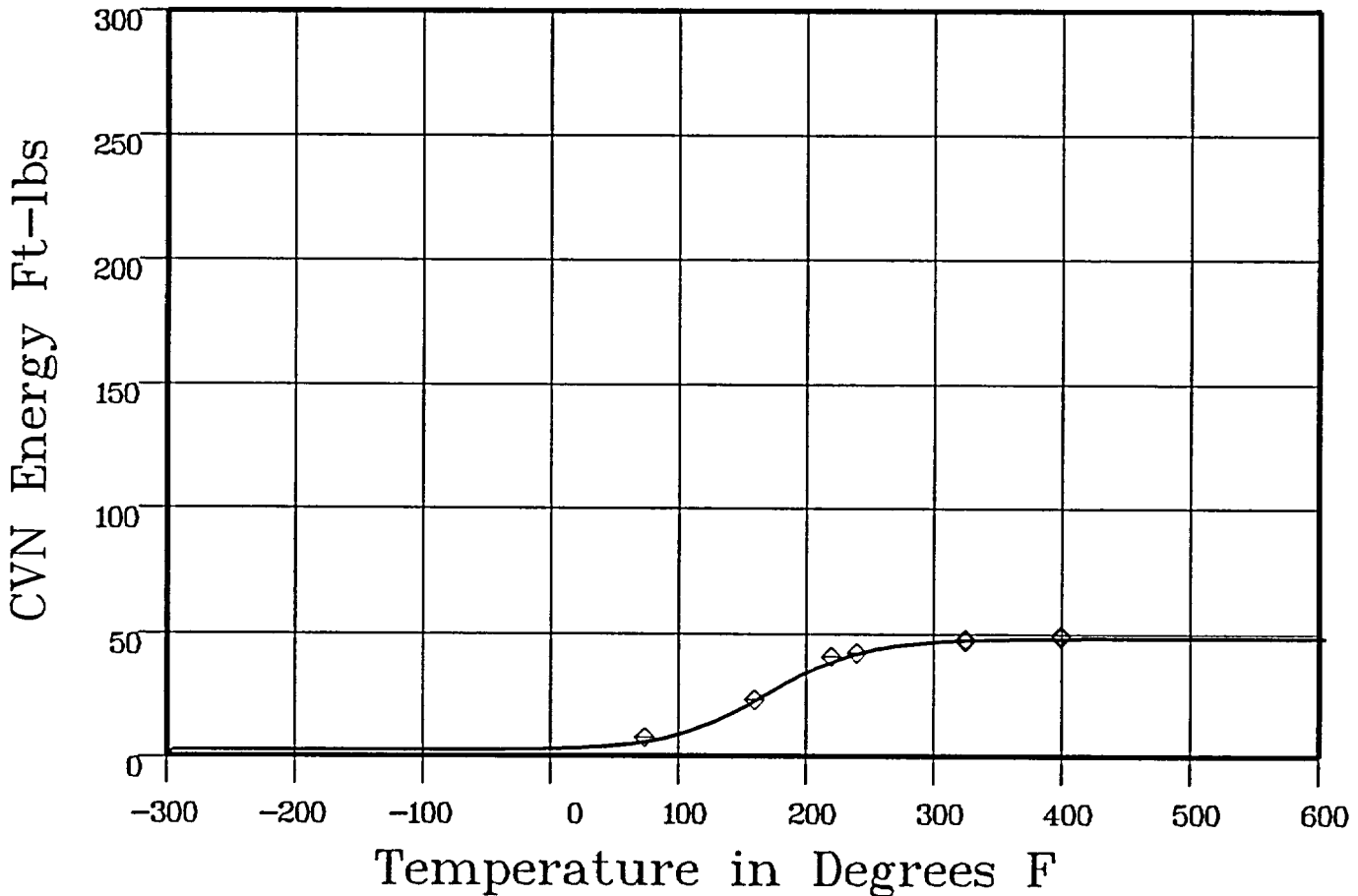
A = 25	B = 22.79	C = 77.08	T0 = 163.5
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 47.79 Fixed    Temp. at 30 ft-lbs: 180.6    Temp. at 50 ft-lbs: \*\*\*\*    Lower Shelf Energy: 2.2 Fixed

Material: WELD LINDE 80    Heat Number: 71249    Orientation:

Capsule: V    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: V    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
74	7.5	6.27	1.22
160	23	23.96	-0.96
220	40.5	39.24	1.25
240	42	42.29	-0.29
325	46.5	47.11	-0.61
325	47.5	47.11	0.38
400	49	47.7	1.29
400	48	47.7	0.29

SUM of RESIDUALS = 2.58

# WELD METAL CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 11:23:09 on 06-19-2002

Page 1

Coefficients of Curve 4

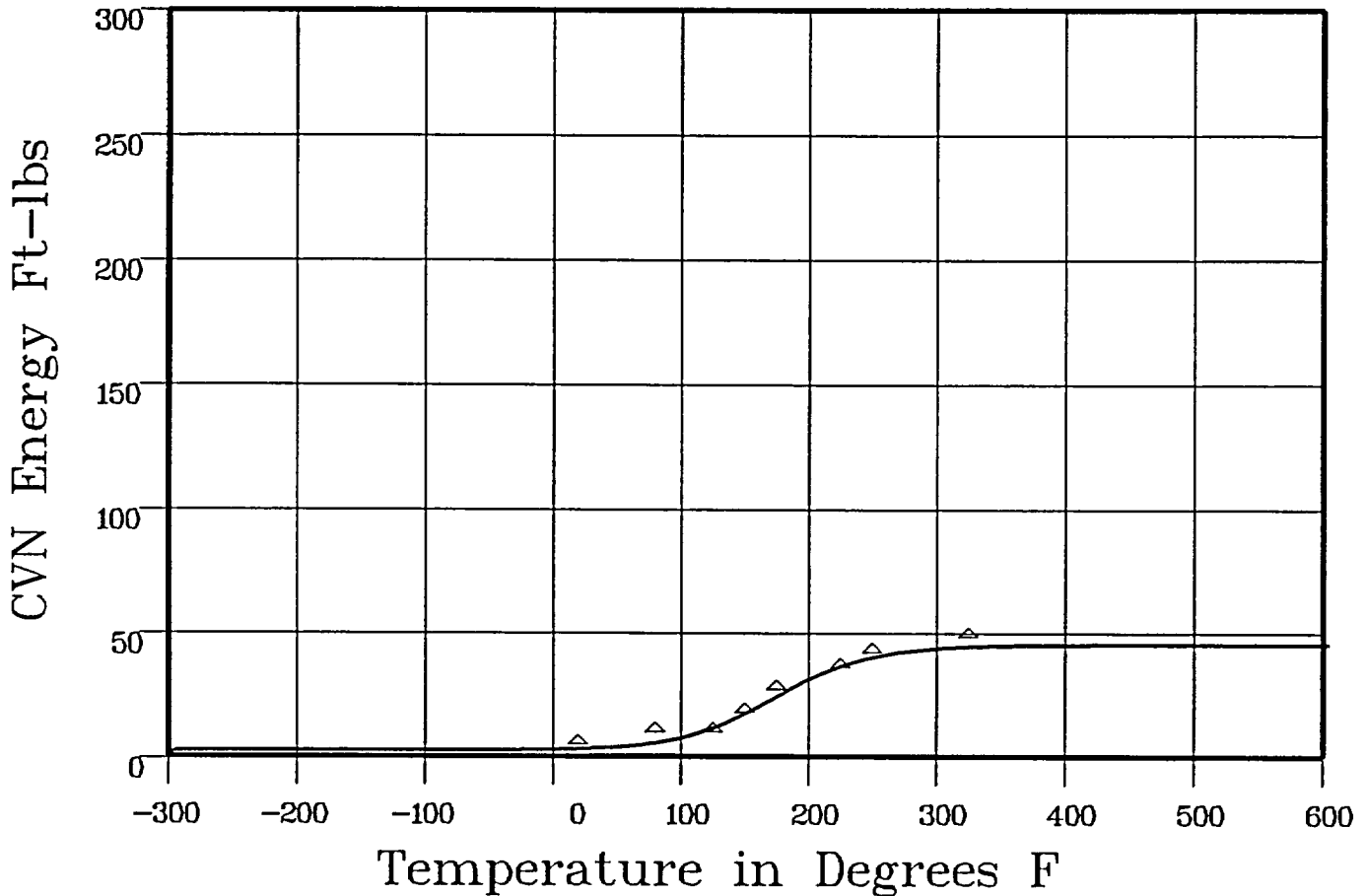
A = 23.6	B = 21.39	C = 75.85	T0 = 167.57
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 45 Fixed    Temp. at 30 ft-lbs: 190.9    Temp. at 50 ft-lbs: \*\*\*\*    Lower Shelf Energy: 2.2 Fixed

Material: WELD LINDE 80    Heat Number: 71249    Orientation:

Capsule: X    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: X    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
20	5	3.05	1.94
80	10	6.06	3.93
125	10	12.7	-2.7
150	18	18.72	-7.2
175	27	25.68	-1.31
225	36	37.28	-1.28
250	42	40.62	1.37

\*\*\*\* Data continued on next page \*\*\*\*

# WELD METAL CAPSULE X

Page 2

Material: WELD LINDE 80

Heat Number: 71249

Orientation:

Capsule: X

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature  
325

Input CVN Energy  
48

Computed CVN Energy  
44.33

Differential  
366

SUM of RESIDUALS = 75

# CAPSULE A5 RECONSTITUTED WELD MATERIAL

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 11:23:09 on 06-19-2002

Page 1

Coefficients of Curve 5

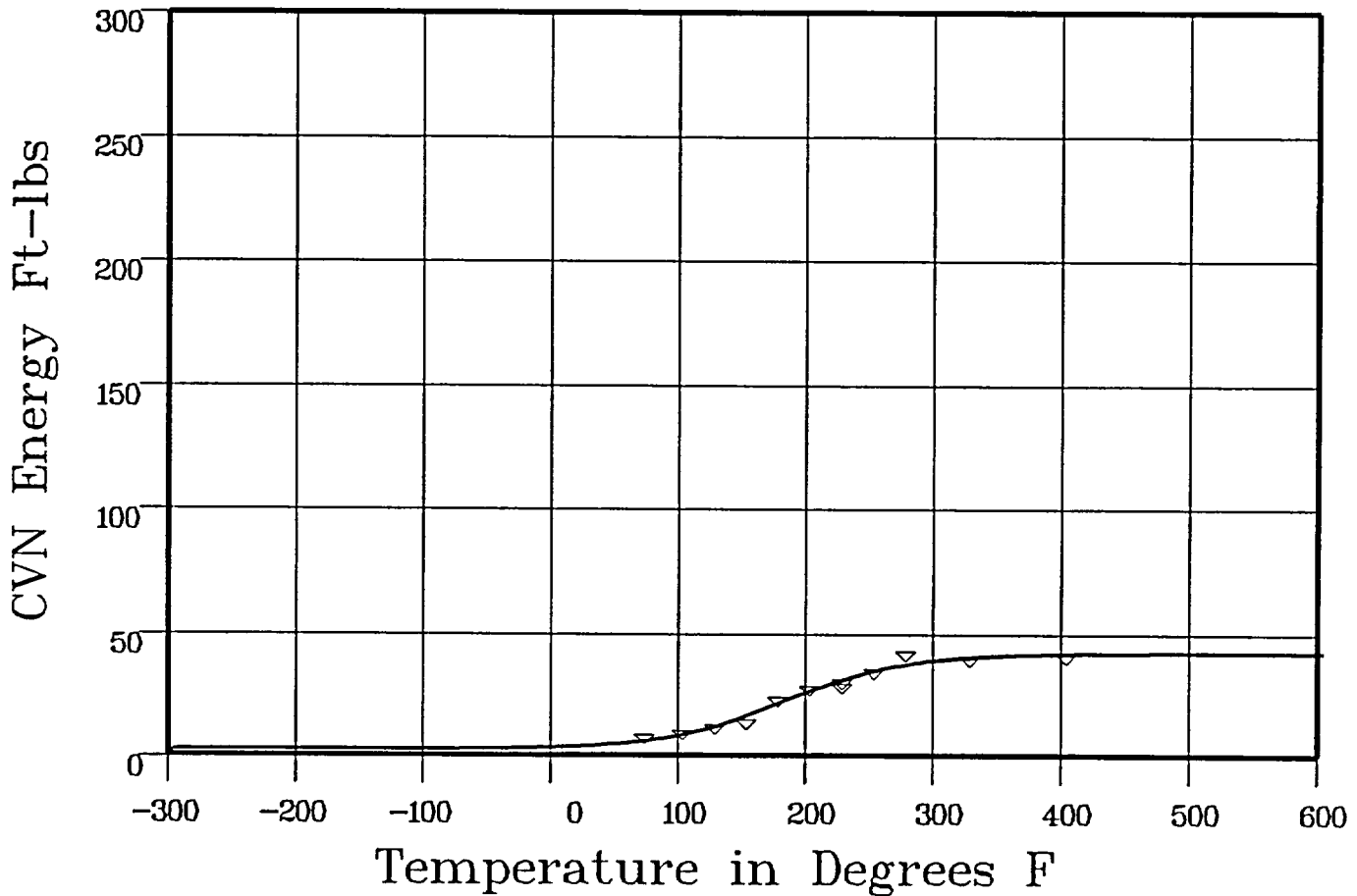
A = 22.1	B = 19.89	C = 96.18	T0 = 175.78
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 42 Fixed    Temp. at 30 ft-lbs: 216.1    Temp. at 50 ft-lbs: \*\*\*\*    Lower Shelf Energy: 22 Fixed

Material: WELD LINDE 80    Heat Number: 71249 FLUX LOT 8445    Orientation:

Capsule: A5    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: A5    Material: WELD LINDE 80    Ori:    Heat #: 71249 FLUX LOT 8445

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
74	8.5	6.47	2.02
104	10.5	9.5	.99
129	13	13.11	-.11
154	15	17.66	-2.66
179	24	22.76	1.23
204	28.5	27.77	.72

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE A5 RECONSTITUTED WELD MATERIAL

Page 2

Material: WELD LINDE 80

Heat Number: 71249 FLUX LOT 8445

Orientation:

Capsule: A5

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input CVN Energy	Computed CVN Energy	Differential
229	31.5	32.1	-.6
229	29.5	32.1	-2.6
254	35.5	35.46	.03
279	42.5	37.83	4.66
329	40.5	40.42	.07
404	41.5	41.65	-.15

SUM of RESIDUALS = 3.59

# WELD METAL UNIRRADIATED

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:35:19 on 06-25-2002

Page 1

Coefficients of Curve 1

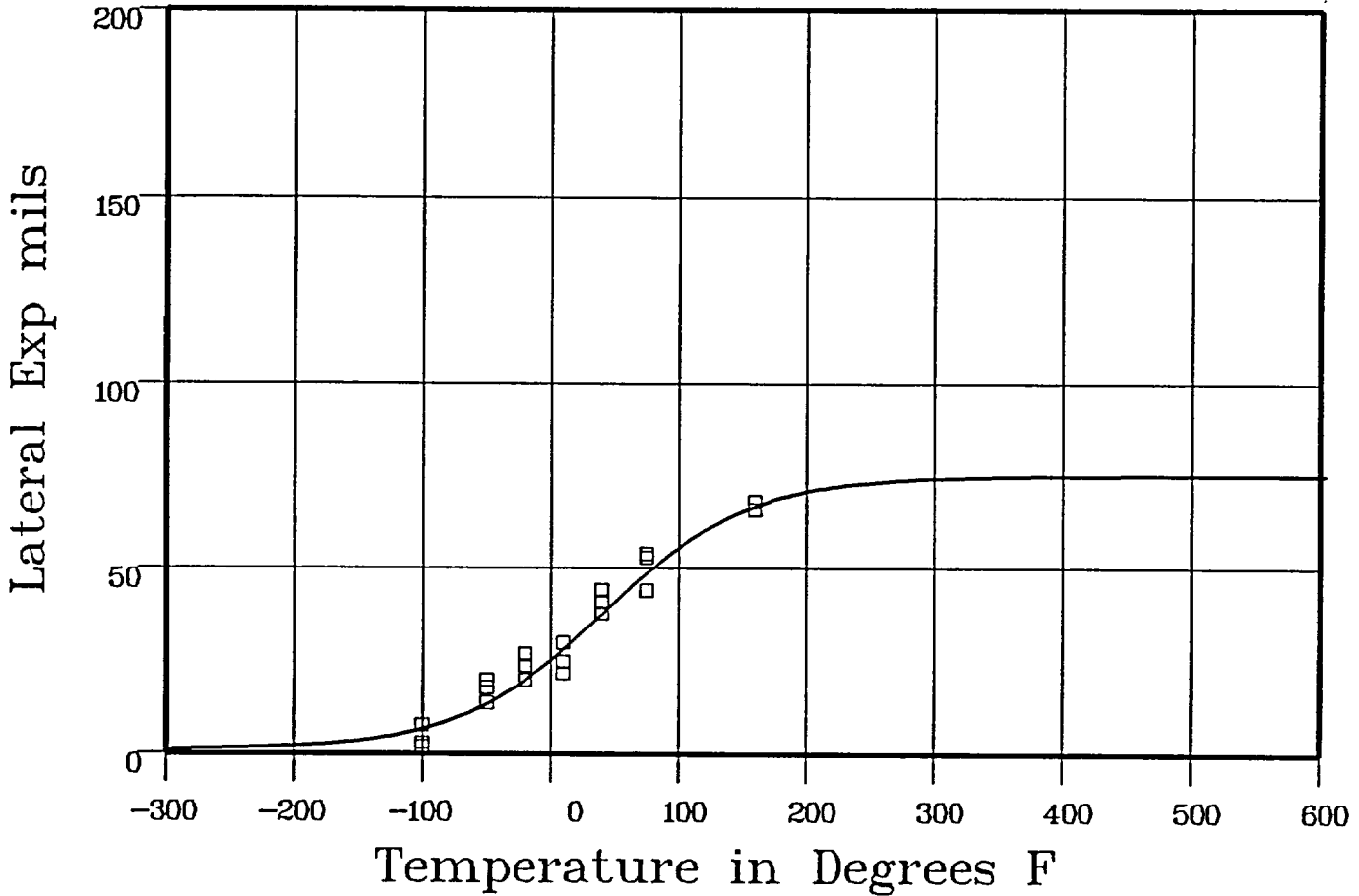
A = 38.13	B = 37.13	C = 115.4	T0 = 36.04
-----------	-----------	-----------	------------

Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 75.26                      Temperature at LE 35: 262                      Lower Shelf LE: 1 Fixed

Material: WELD LINDE 80                      Heat Number: 71249                      Orientation:

Capsule: UNIRR                      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: UNIRR    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-100	8	7.42	.57
-100	3	7.42	-4.42
-100	2	7.42	-5.42
-50	20	14.64	5.35
-50	18	14.64	3.35
-50	14	14.64	-6.4
-20	24	21.39	2.6
-20	27	21.39	5.6
-20	20	21.39	-1.39

\*\*\*\* Data continued on next page \*\*\*\*

# WELD METAL UNIRRADIATED

Page 2

Material: WELD LINDE 80      Heat Number: 71249      Orientation:  
Capsule: UNIRR      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
10	30	29.89	1
10	25	29.89	-4.89
10	22	29.89	-7.89
40	44	39.4	4.59
40	38	39.4	-1.4
40	41	39.4	1.59
75	44	50.2	-6.2
75	54	50.2	3.79
75	53	50.2	2.79
160	66	67.5	-1.5
160	68	67.5	.49
160	68	67.5	.49
			SUM of RESIDUALS = -2.39

# WELD METAL CAPSULE T

CVGRAPH 41 Hyperbolic Tangent Curve Printed at 10:35:19 on 06-25-2002

Page 1

Coefficients of Curve 2

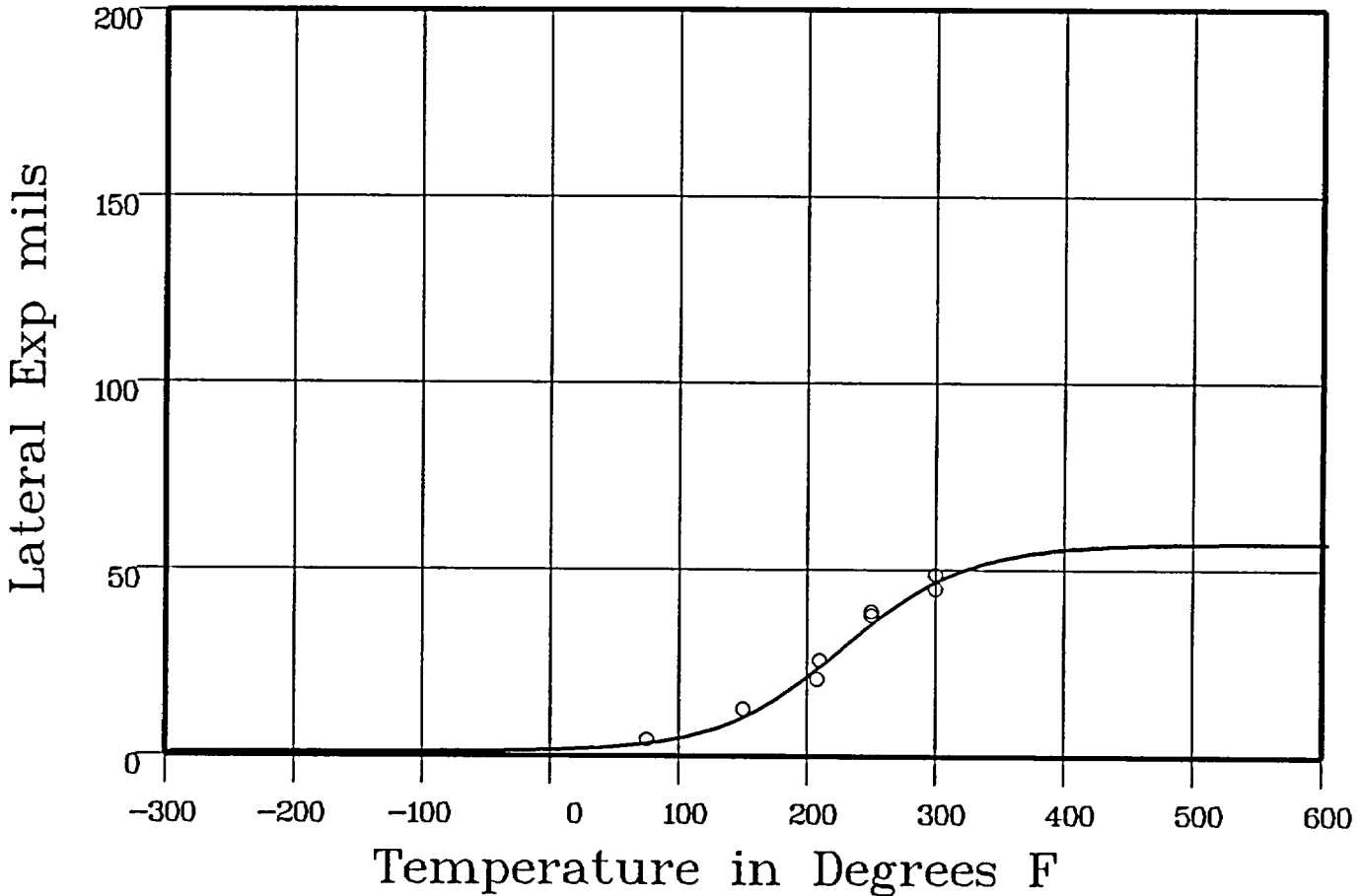
A = 29.13	B = 28.13	C = 98.34	T0 = 222.66
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Equation is:  $LE = A + B * [ \tanh((T - T0)/C) ]$

Upper Shelf LE: 57.27                      Temperature at LE 35: 243.4                      Lower Shelf LE: 1 Fixed

Material: WELD LINDE 80                      Heat Number: 71249                      Orientation:

Capsule: T                      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
75	4.5	3.66	.83
150	13	11.45	154
208	21	24.97	-3.97
210	26	25.53	.46
250	38	36.76	1.23
250	39	36.76	2.23
300	45	47.6	-2.6
300	49	47.6	1.39

SUM of RESIDUALS = 1.11

# WELD METAL CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:35:19 on 06-25-2002

Page 1

Coefficients of Curve 3

A = 23	B = 22	C = 80.36	T0 = 176.66
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 45

Temperature at LE 35: 225.8

Lower Shelf LE: 1 Fixed

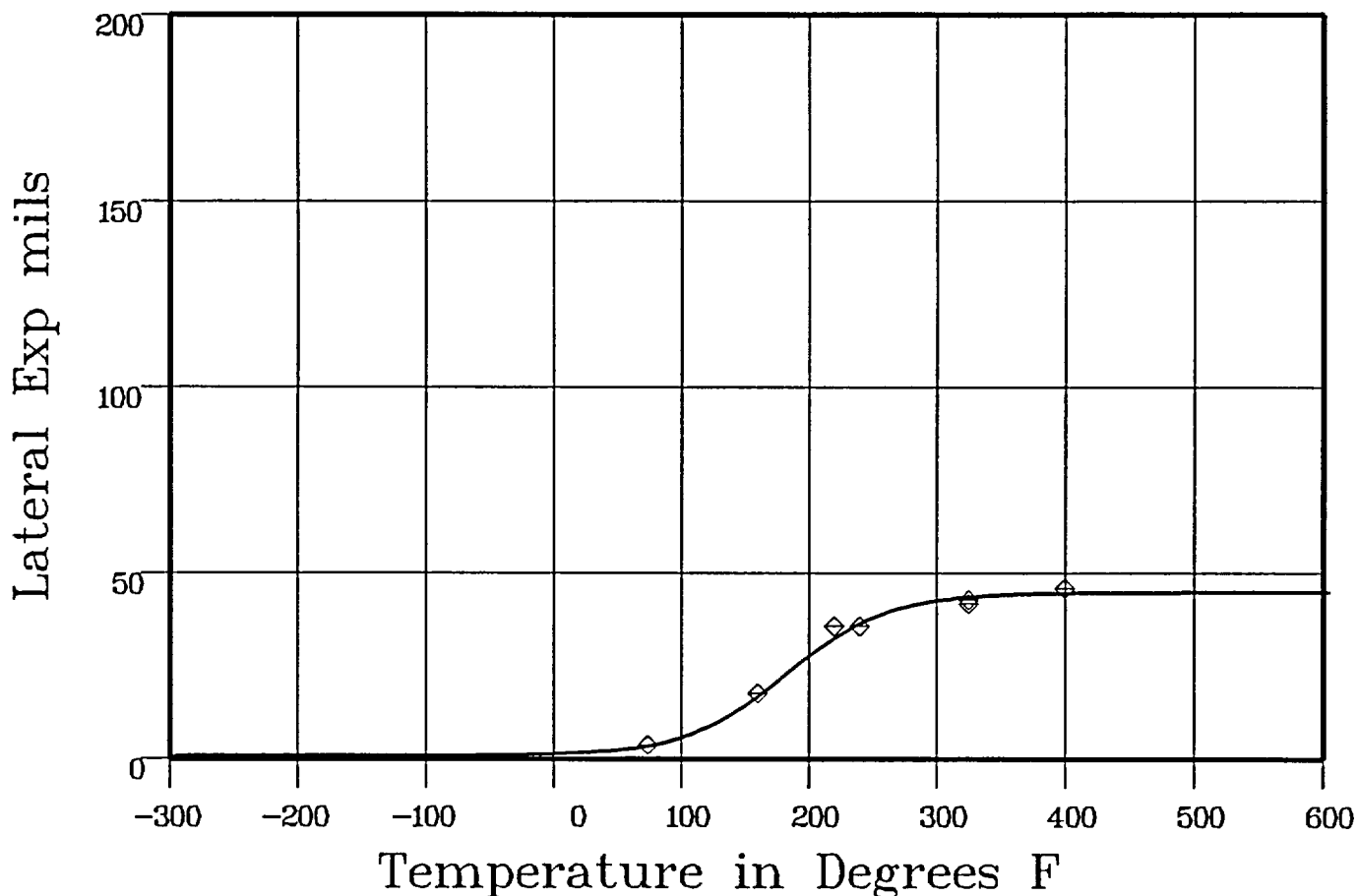
Material: WELD LINDE 80

Heat Number: 71249

Orientation:

Capsule: V

Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: V

Material: WELD LINDE 80

Ori:

Heat #: 71249

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
74	4	4.17	-.17
160	18	18.5	-.5
220	36	33.83	2.16
240	36	37.46	-1.46
325	42	43.92	-1.92
325	43	43.92	-.92
400	46	44.83	1.16
400	46	44.83	1.16

SUM of RESIDUALS = -.49

# WELD METAL CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:35:19 on 06-25-2002

Page 1

Coefficients of Curve 4

A = 17.56	B = 16.56	C = 79.95	T0 = 195
-----------	-----------	-----------	----------

Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 34.13

Temperature at LE 35: 225.8

Lower Shelf LE: 1 Fixed

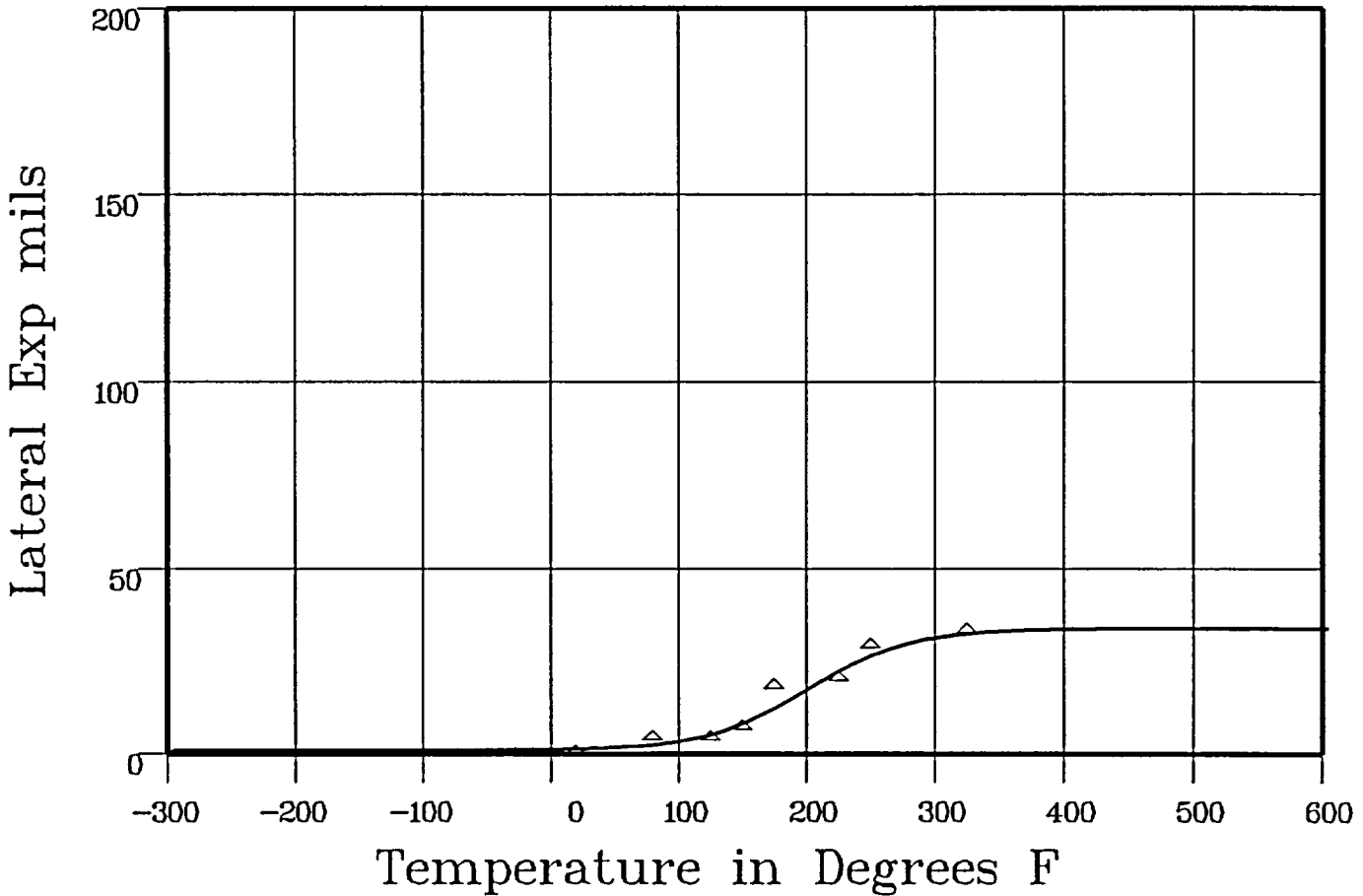
Material: WELD LINDE 80

Heat Number: 71249

Orientation:

Capsule: X

Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: X    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
20	0	141	-141
80	4	276	123
125	4	5.9	-19
150	7	9.11	-2.11
175	18	13.5	4.49
225	20	23.51	-3.51
250	29	27.45	1.54

\*\*\*\* Data continued on next page \*\*\*\*

# WELD METAL CAPSULE X

Page 2

Material: WELD LINDE 80      Heat Number: 71249      Orientation:  
Capsule: X      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
325	33	32.9	.09
			SUM of RESIDUALS = -158

# CAPSULE A5 RECONSTITUTED WELD METAL

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:35:19 on 06-25-2002

Page 1

Coefficients of Curve 5

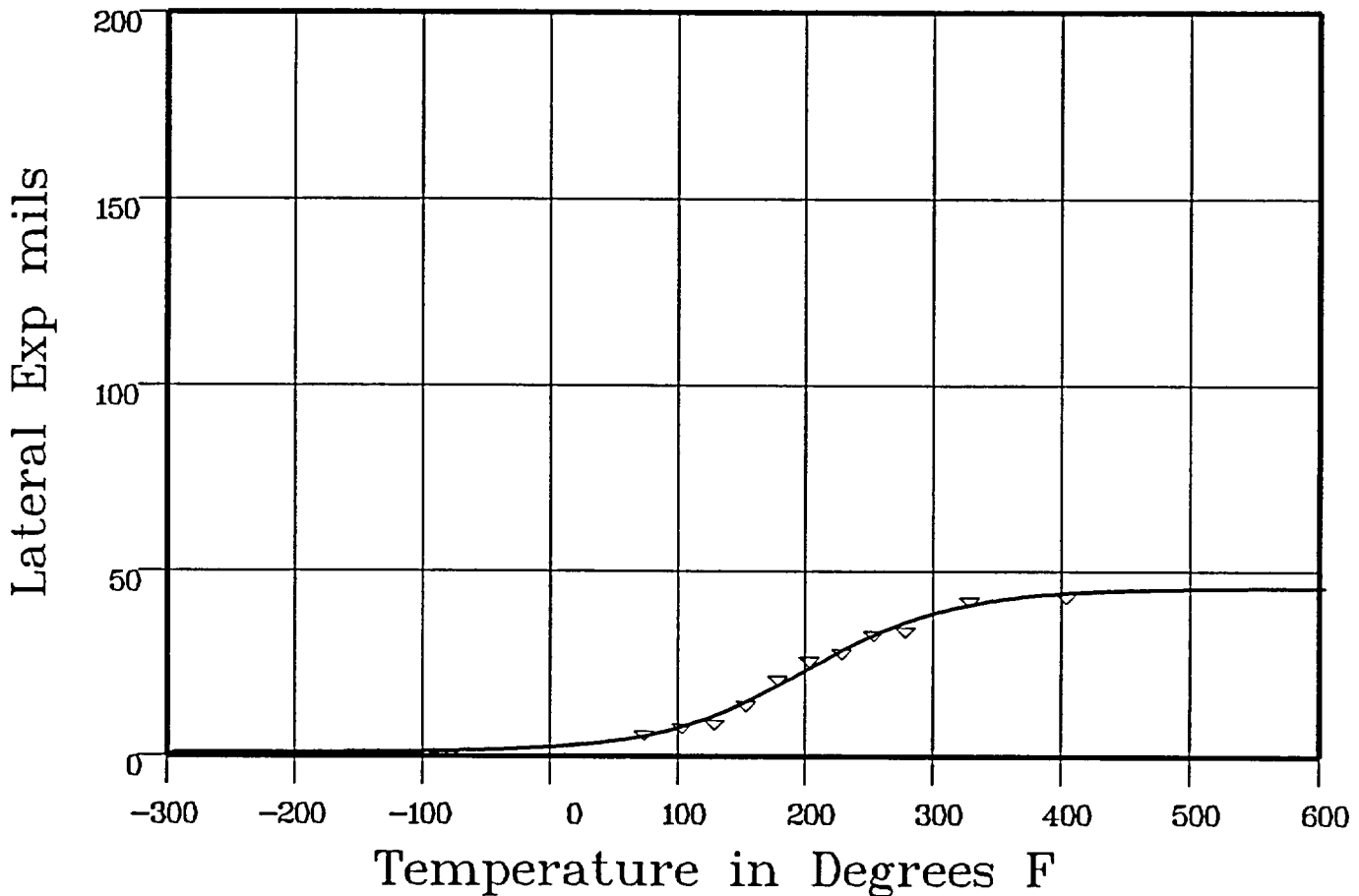
A = 233	B = 223	C = 117.51	T0 = 194.52
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 45.61      Temperature at LE 35: 262.8      Lower Shelf LE: 1 Fixed

Material: WELD LINDE 80      Heat Number: 71249 FLUX LOT 8445      Orientation:

Capsule: A5      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3      Cap: A5      Material: WELD LINDE 80      Ori:      Heat #: 71249 FLUX LOT 8445

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
74	7	6.08	.91
104	9	8.87	.12
129	10	12.01	-2.01
154	15	15.9	-.9
179	22	20.37	1.62
204	27	25.1	1.89

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE A5 RECONSTITUTED WELD METAL

Page 2

Material: WELD LINDE 80

Heat Number: 71249 FLUX LOT 8445

Orientation:

Capsule: A5

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
229	29	29.67	-.67
229	29	29.67	-.67
254	34	33.72	.27
279	35	37.05	-2.05
329	43	41.51	1.48
404	44	44.39	-.39

SUM of RESIDUALS = -39

# WELD METAL UNIRRADIATED

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:43:00 on 06-25-2002

Page 1

Coefficients of Curve 1

A = 50	B = 50	C = 9566	T0 = 29.06
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 29

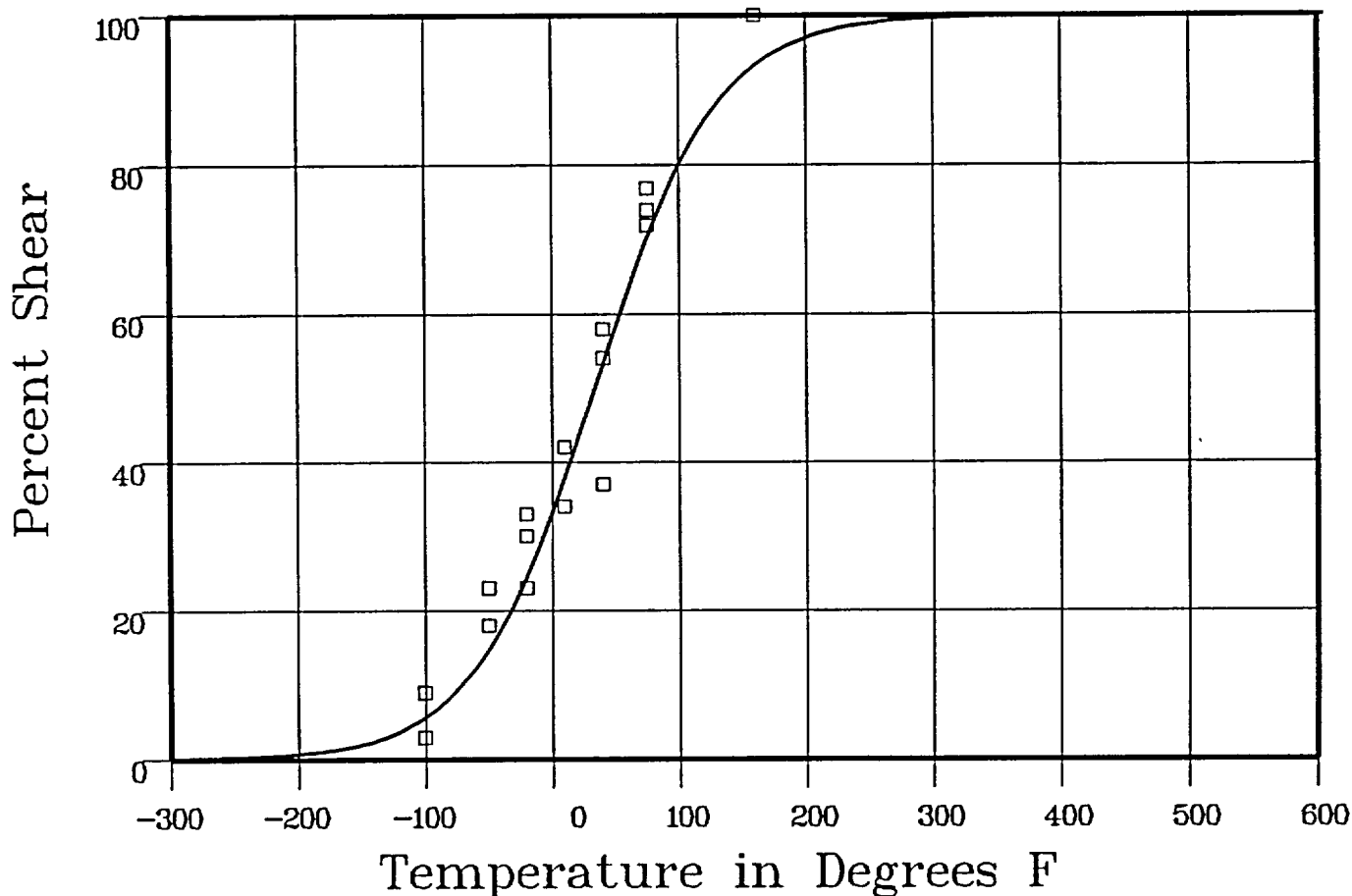
Material: WELD LINDE 80

Heat Number: 71249

Orientation:

Capsule: UNIRR

Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: UNIRR    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-100	9	6.3	2.69
-100	3	6.3	-3.3
-100	3	6.3	-3.3
-50	18	16.07	1.92
-50	23	16.07	6.92
-50	18	16.07	1.92
-20	30	26.39	3.6
-20	33	26.39	6.6
-20	23	26.39	-3.39

\*\*\*\* Data continued on next page \*\*\*\*

# WELD METAL UNIRRADIATED

Page 2

Material: WELD LINDE 80

Heat Number: 71249

Orientation:

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
10	42	40.16	1.83
10	42	40.16	1.83
10	34	40.16	-6.16
40	37	55.69	-18.69
40	58	55.69	2.3
40	54	55.69	-1.69
75	74	72.31	1.68
75	72	72.31	-.31
75	77	72.31	4.68
160	100	93.91	6.08
160	100	93.91	6.08
160	100	93.91	6.08

SUM of RESIDUALS = 17.39

# WELD METAL CAPSULE T

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:43:00 on 06-25-2002

Page 1

Coefficients of Curve 2

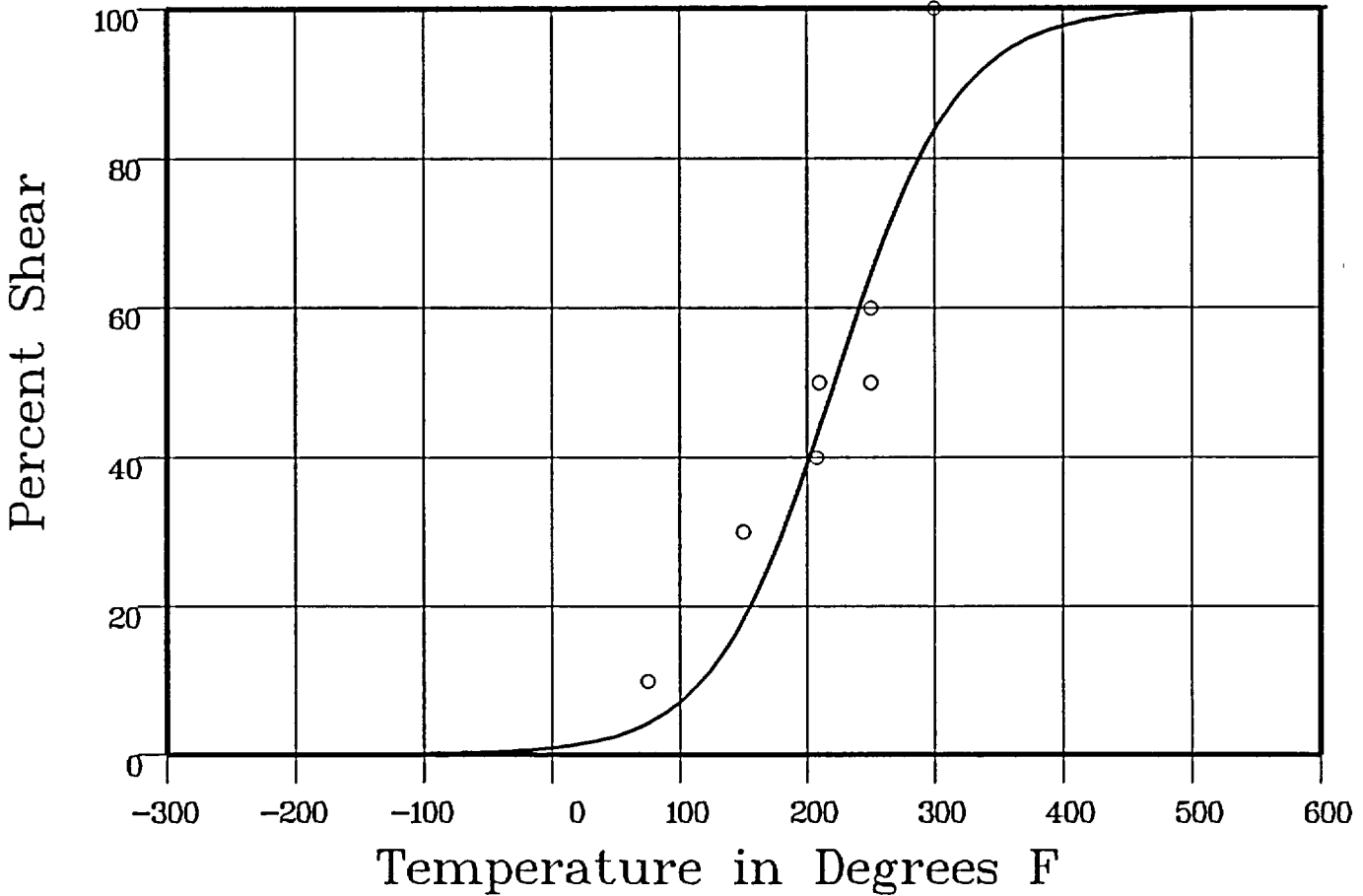
A = 50	B = 50	C = 95.53	T0 = 217.03
--------	--------	-----------	-------------

Equation is  $\text{Shear}\% = A + B * | \tanh((T - T_0)/C) |$

Temperature at 50% Shear: 217

Material: WELD LINDE 80      Heat Number: 71249      Orientation:

Capsule: T      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
75	10	4.86	5.13
150	30	19.72	10.27
208	40	45.28	-5.28
210	50	46.32	3.67
250	50	66.6	-16.6
250	60	66.6	-6.6
300	100	85.03	14.96
300	100	85.03	14.96

SUM of RESIDUALS = 20.53

# WELD METAL CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:43:00 on 06-25-2002

Page 1

Coefficients of Curve 3

A = 50	B = 50	C = 74.85	T0 = 218.43
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 218.4

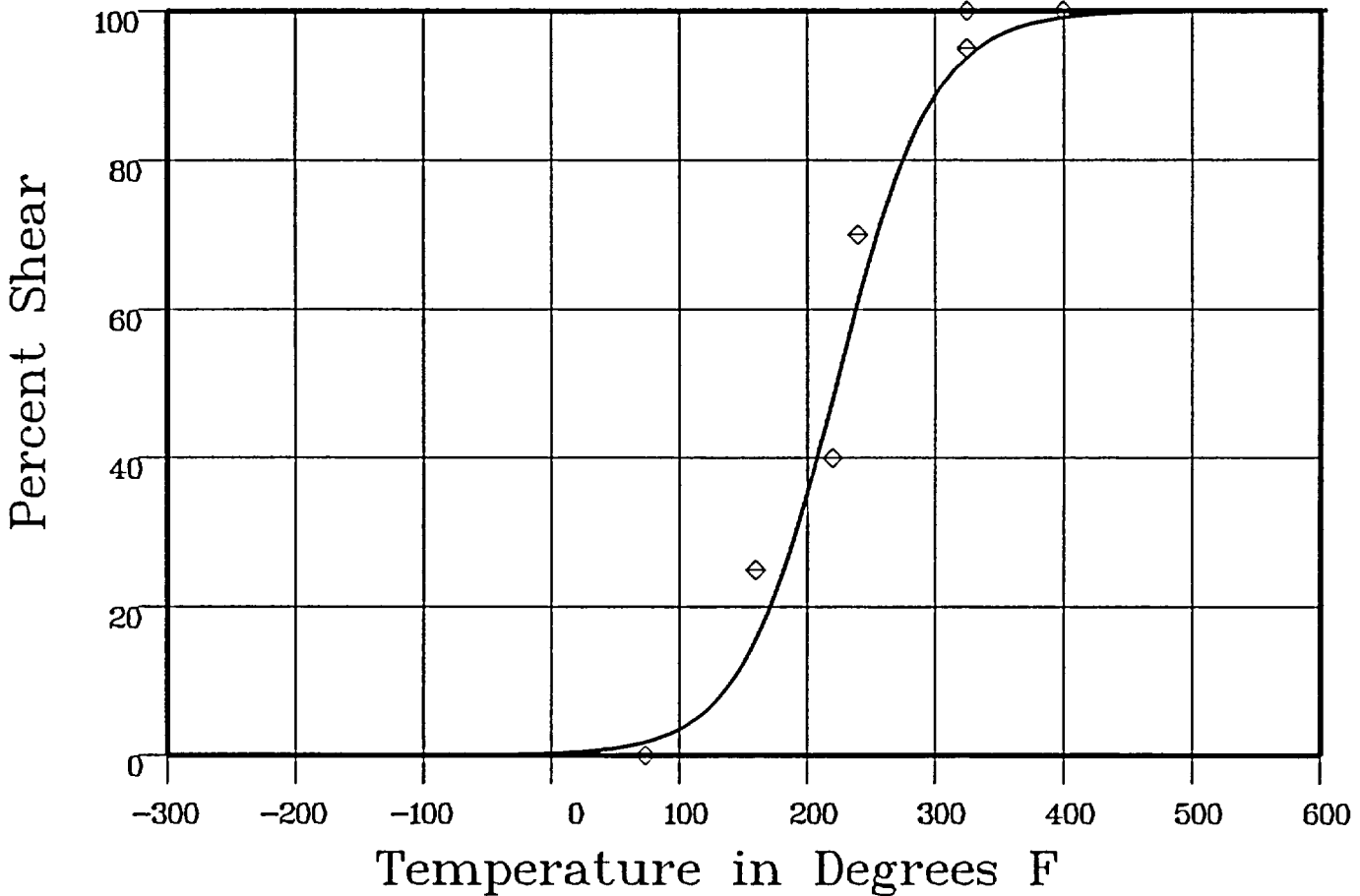
Material: WELD LINDE 80

Heat Number: 71249

Orientation:

Capsule: V

Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: V

Material: WELD LINDE 80

Ori:

Heat #: 71249

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
74	0	2.06	-2.06
160	25	17.34	7.65
220	40	51.04	-11.04
240	70	64.01	5.98
325	95	94.51	.48
325	100	94.51	5.48
400	100	99.22	.77
400	100	99.22	.77

SUM of RESIDUALS = 8.04

# WELD METAL CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:43:00 on 06-25-2002

Page 1

Coefficients of Curve 4

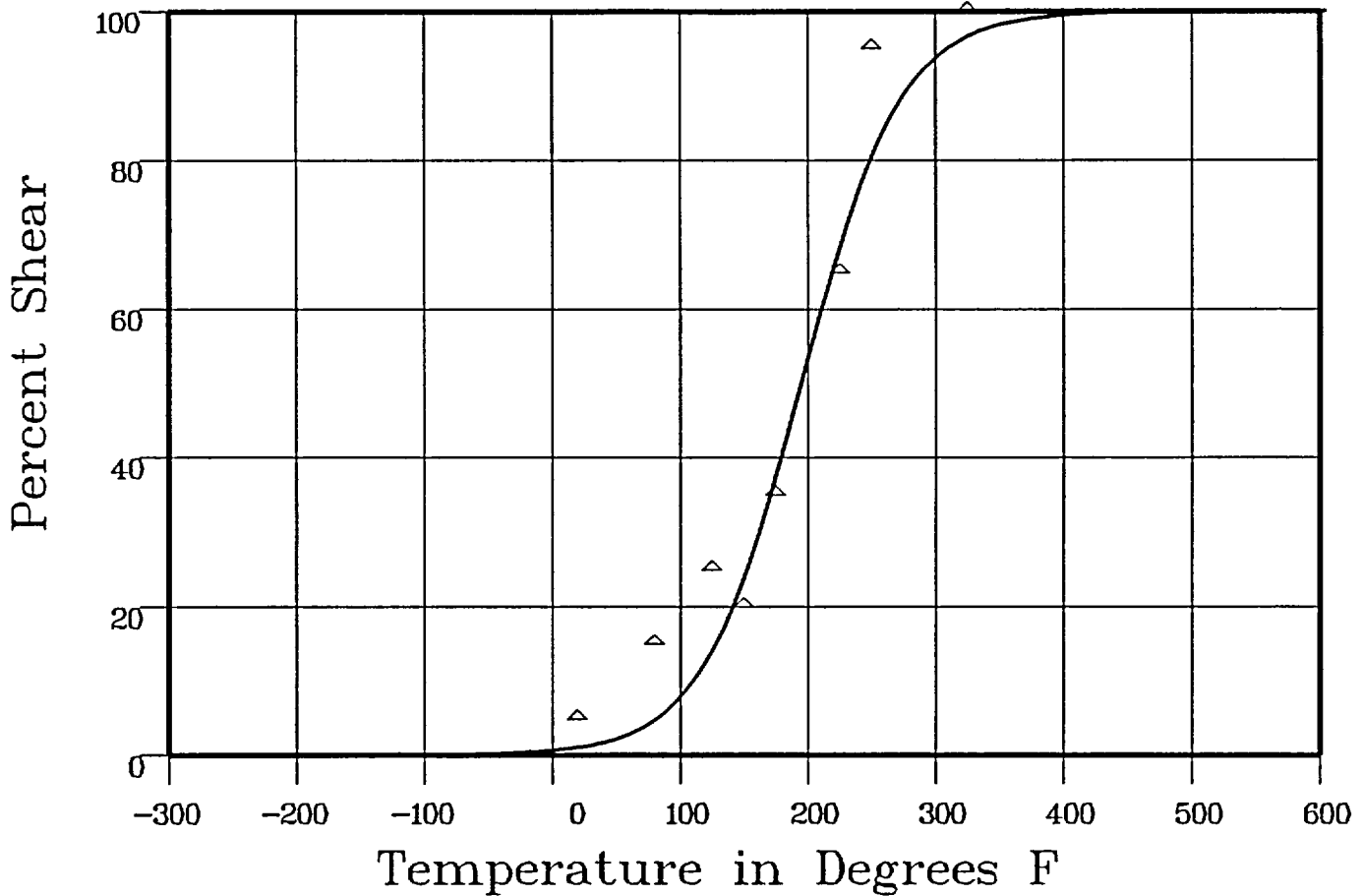
A = 50	B = 50	C = 77.5	T0 = 190.31
--------	--------	----------	-------------

Equation is  $Shear\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 190.3

Material: WELD LINDE 80      Heat Number: 71249      Orientation:

Capsule: X      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: X    Material: WELD LINDE 80    Ori:    Heat #: 71249

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
20	5	121	3.78
80	15	5.48	9.51
125	25	15.63	9.36
150	20	26.1	-6.1
175	35	40.24	-5.24
225	65	70.99	-5.99
250	95	82.35	12.64

\*\*\*\* Data continued on next page \*\*\*\*

# WELD METAL CAPSULE X

Page 2

Material: WELD LINDE 80      Heat Number: 71249      Orientation:  
Capsule: X      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
325	100	96.99	3
			SUM of RESIDUALS = 20.95

# CAPSULE A5 RECONSTITUTED WELD METAL

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:43:00 on 06-25-2002

Page 1

Coefficients of Curve 5

A = 50	B = 50	C = 87.48	T0 = 160.83
--------	--------	-----------	-------------

Equation is:  $Shear\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 160.8

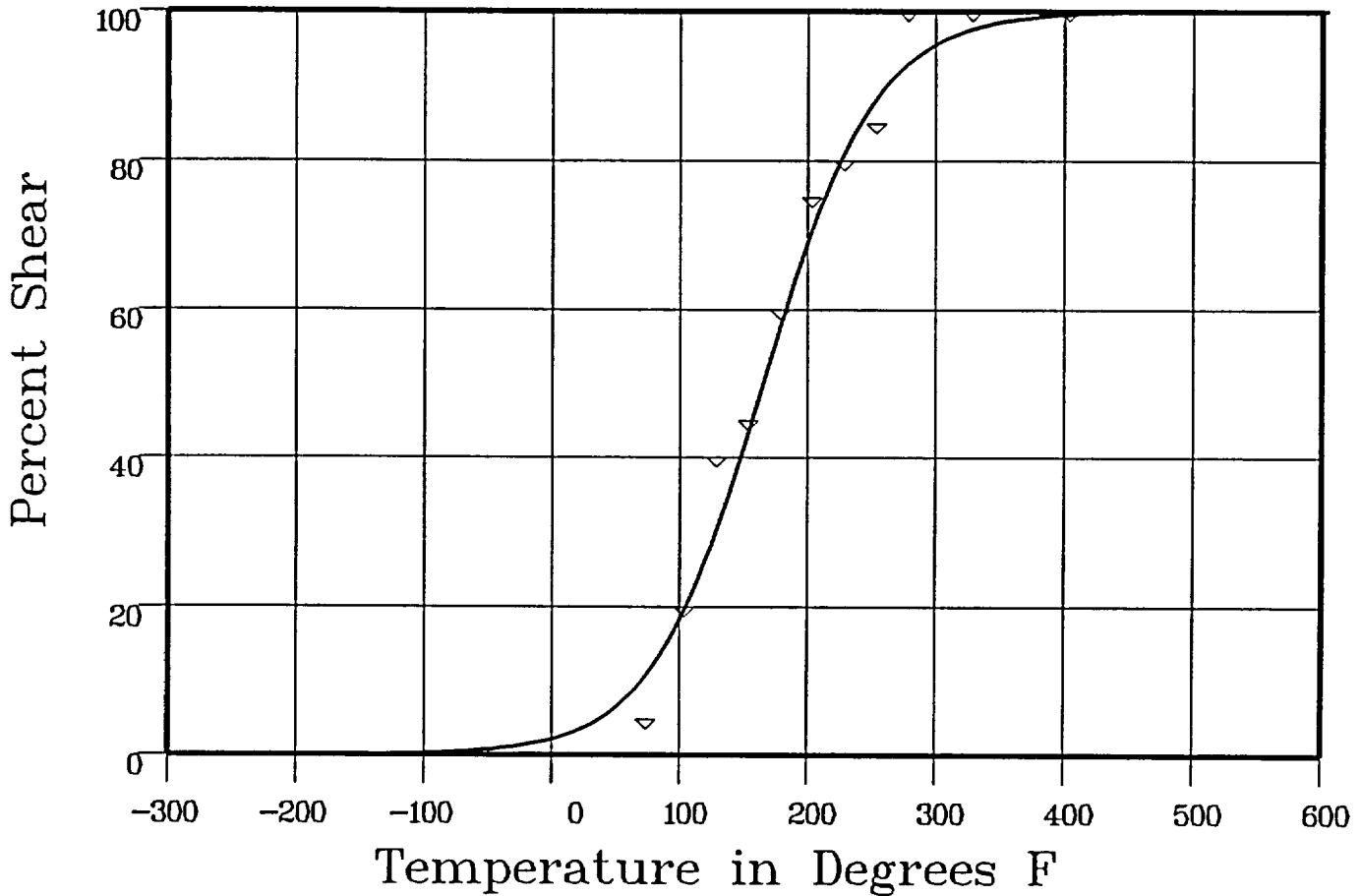
Material: WELD LINDE 80

Heat Number: 71249 FLUX LOT 8445

Orientation:

Capsule: A5

Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: A5    Material: WELD LINDE 80    Ori:    Heat #: 71249 FLUX LOT 8445

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
74	5	12.07	-7.07
104	20	21.42	-1.42
129	40	32.56	7.43
154	45	46.09	-1.09
179	60	60.23	-2.3
204	75	72.84	2.15

\*\*\*\* Data continued on next page \*\*\*\*

# CAPSULE A5 RECONSTITUTED WELD METAL

Page 2

Material: WELD LINDE 80

Heat Number: 71249 FLUX LOT 8445

Orientation:

Capsule: A5

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
229	80	82.6	-2.6
229	80	82.6	-2.6
254	85	89.37	-4.37
279	100	93.7	6.29
329	100	97.9	2.09
404	100	99.61	.38
			SUM of RESIDUALS = -1.06

# HEAT AFFECTED ZONE UNIRRADIATED

CVGRAPH 41 Hyperbolic Tangent Curve Printed at 09:13:55 on 06-18-2002

Page 1

Coefficients of Curve 1

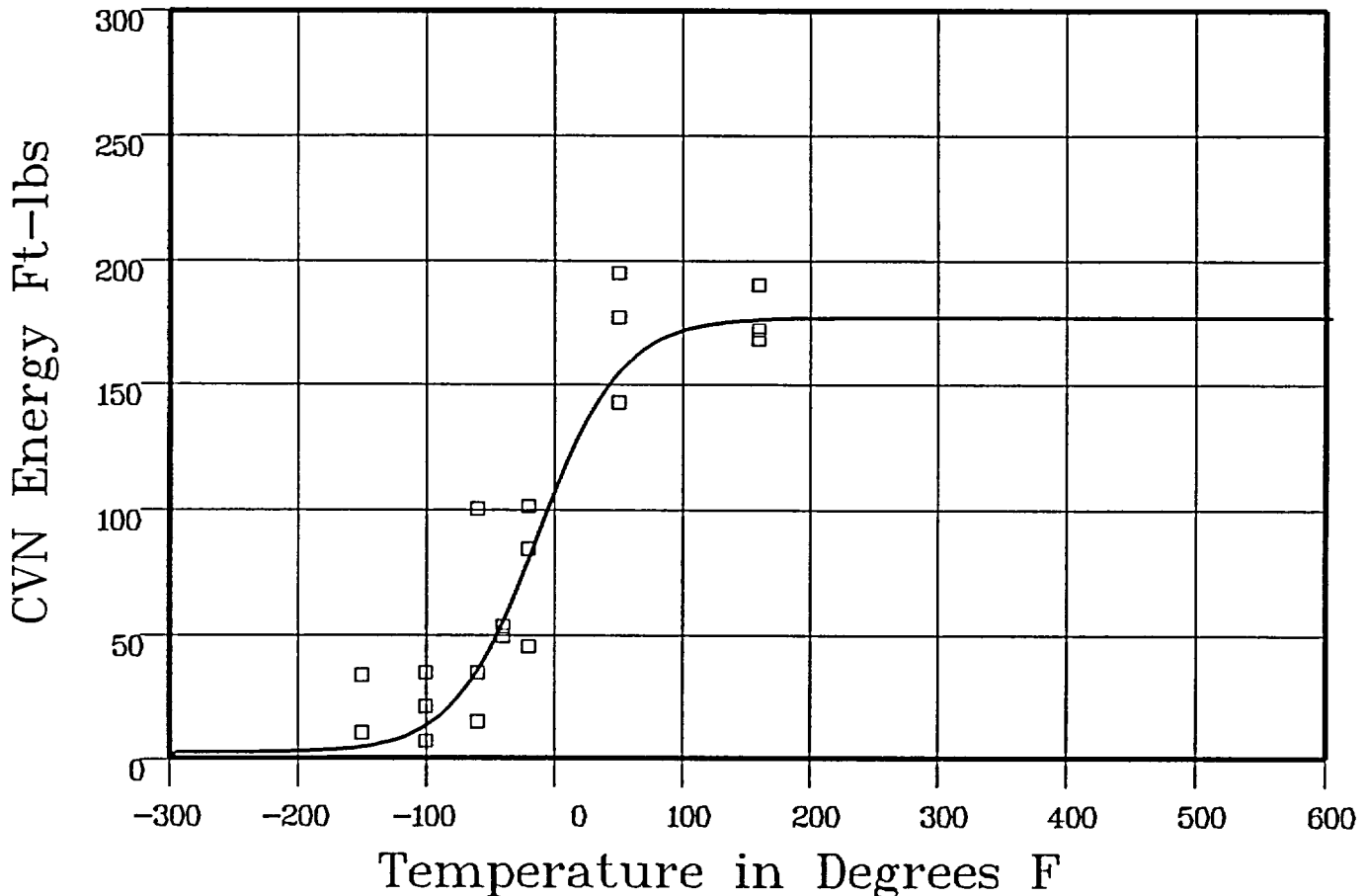
A = 89.59	B = 87.4	C = 65.37	T0 = -17.34
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 177 Fixed    Temp. at 30 ft-lbs: -71.7    Temp. at 50 ft-lbs: -49.2    Lower Shelf Energy: 2.19 Fixed

Material: HEAT AFFECTED ZONE    Heat Number:    Orientation:

Capsule: UNIRR    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: UNIRR    Material: HEAT AFFECTED ZONE    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-150	335	5.16	2833
-150	105	5.16	533
-100	7	15.11	-8.11
-100	21	15.11	5.88
-100	345	15.11	1938
-60	100	39.48	60.51
-60	345	39.48	-4.98
-60	15	39.48	-24.48
-40	49	60.46	-11.46

\*\*\*\* Data continued on next page \*\*\*\*

# HEAT AFFECTED ZONE UNIRRADIATED

Page 2

Material: HEAT AFFD ZONE      Heat Number:      Orientation:

Capsule: UNIRR      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-40	53	60.46	-7.46
-20	45	86.05	-41.05
-20	101	86.05	14.94
-20	84	86.05	-2.05
50	142.5	157.24	-14.74
50	195	157.24	37.75
50	177	157.24	19.75
160	190	176.23	13.76
160	172	176.23	-4.23
160	168	176.23	-8.23
			SUM of RESIDUALS = 78.84

# HEAT AFFECTED ZONE CAPSULE T

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 09:13:55 on 06-18-2002

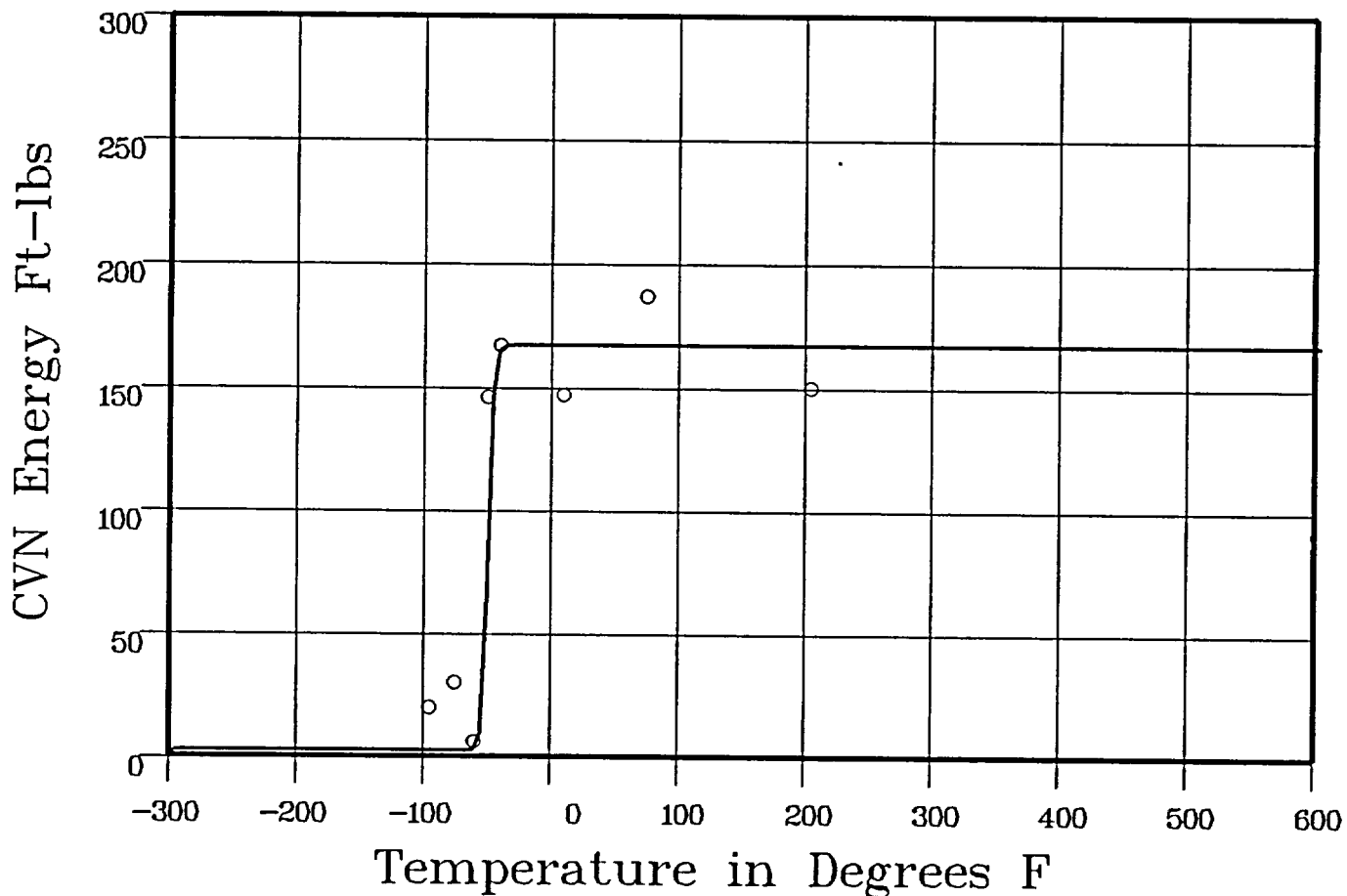
Page 1

Coefficients of Curve 2

A = 84.59	B = 82.4	C = 3.94	T0 = -53.9
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 167 Fixed    Temp. at 30 ft-lbs: -57    Temp. at 50 ft-lbs: -55.6    Lower Shelf Energy: 2.19 Fixed  
 Material: HEAT AFFD ZONE SA5082    Heat Number:    Orientation:  
 Capsule: T    Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: T    Material: HEAT AFFD ZONE SA5082    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-95	20	2.19	17.8
-75	30	2.2	27.79
-60	6	9.39	-3.39
-50	146	146.99	-.99
-40	167	166.85	.14
10	147	167	-20
75	187	167	20
205	150	167	-17
SUM of RESIDUALS =			24.35

# HEAT AFFECTED ZONE CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 09:13:55 on 06-18-2002

Page 1

Coefficients of Curve 3

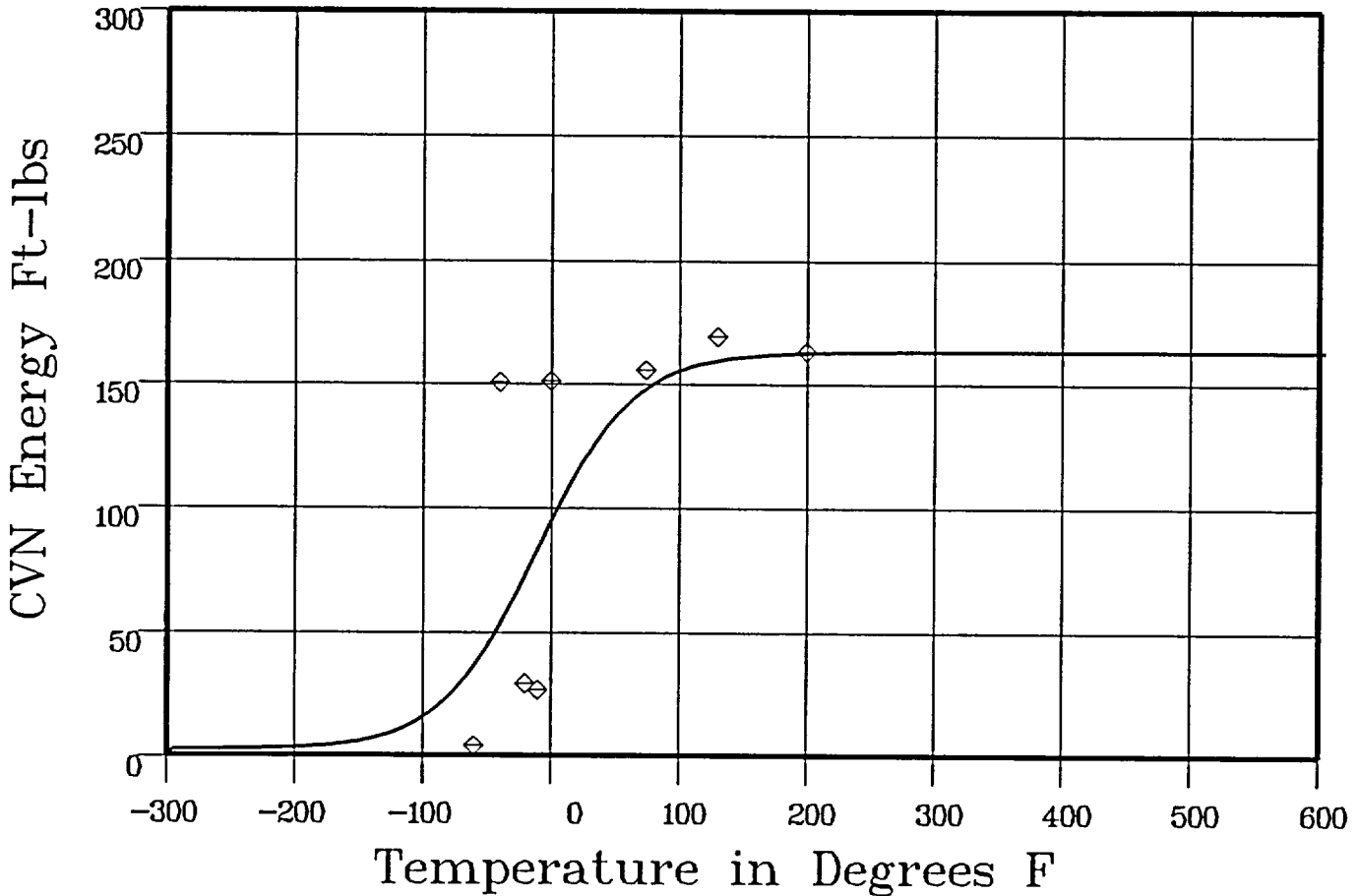
A = 82.59	B = 80.4	C = 74.67	T0 = -15.46
-----------	----------	-----------	-------------

Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 163 Fixed    Temp. at 30 ft-lbs: -73.9    Temp. at 50 ft-lbs: -47.5    Lower Shelf Energy: 2.19 Fixed

Material: HEAT AFFD ZONE SA5082    Heat Number:    Orientation:

Capsule: V    Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: V    Material: HEAT AFFD ZONE SA5082    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-60	4	39.63	-35.63
-40	150.5	57.09	93.4
-20	29	77.72	-48.72
-10	26.5	88.47	-61.97
0	151	99.02	51.97
74	155.5	149.58	5.91
130	169	159.79	9.2
200	163	162.5	.49

SUM of RESIDUALS = 14.66

# HEAT AFFECTED ZONE CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 09:13:55 on 06-18-2002

Page 1

Coefficients of Curve 4

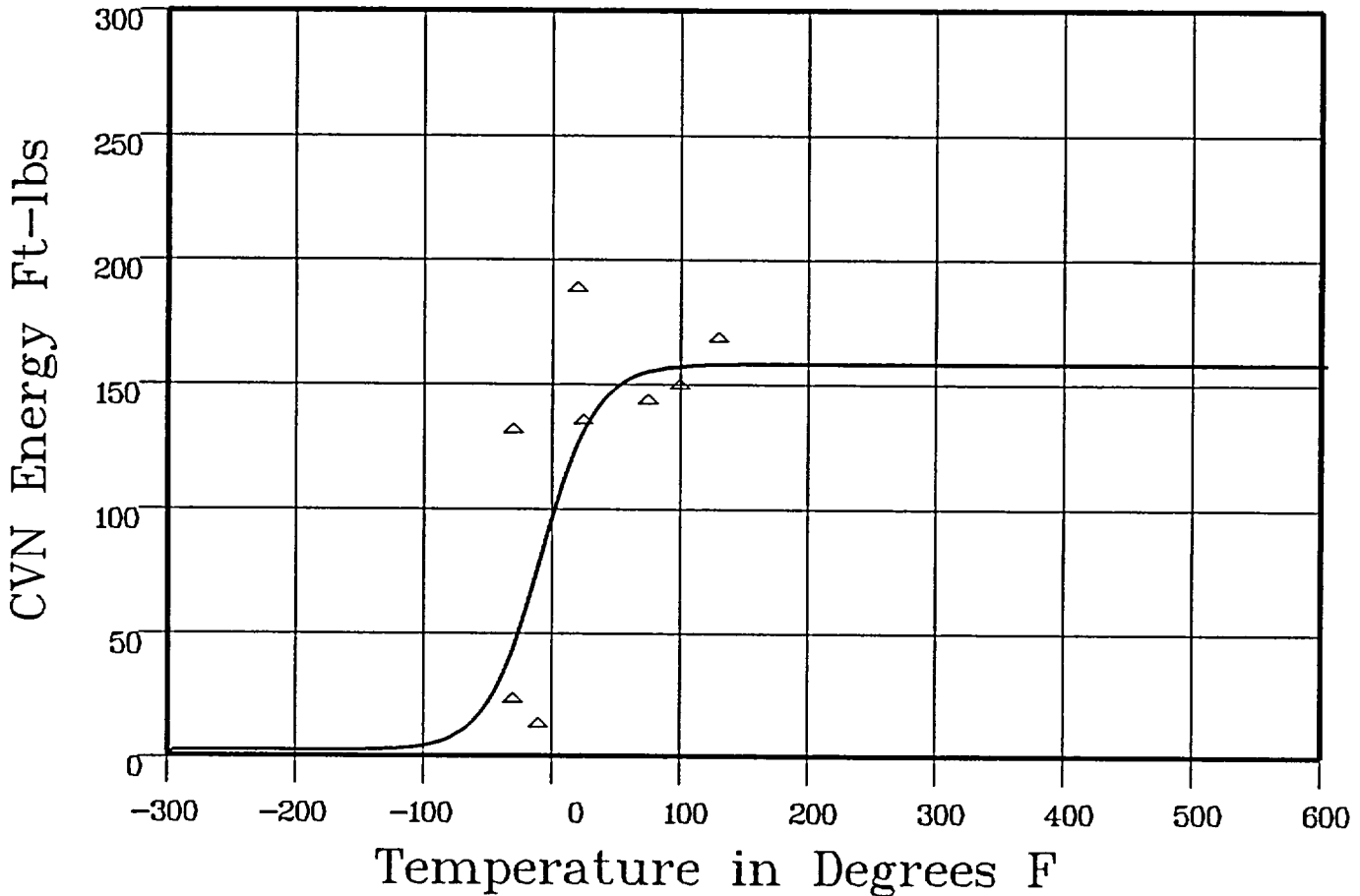
A = 80.09	B = 77.9	C = 42.76	T0 = -13.12
-----------	----------	-----------	-------------

Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 158 Fixed    Temp. at 30 ft-lbs: -45.7    Temp. at 50 ft-lbs: -30.5    Lower Shelf Energy: 2.19 Fixed

Material: HEAT AFFD ZONE    Heat Number:    Orientation:

Capsule: X    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: X    Material: HEAT AFFD ZONE    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-30	130	50.86	79.13
-30	22	50.86	-28.86
-10	12	85.78	-73.78
20	187	130.7	56.29
25	134	135.57	-1.57
75	142	155.51	-13.51
100	148	157.21	-9.21

\*\*\*\* Data continued on next page \*\*\*\*

# HEAT AFFECTED ZONE CAPSULE X

Page 2

Material: HEAT AFFD ZONE      Heat Number:      Orientation:

Capsule: X      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature  
130

Input CVN Energy  
167

Computed CVN Energy  
157.8

Differential  
919

SUM of RESIDUALS = 17.67

# HEAT AFFECTED ZONE UNIRRADIATED

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 09:58:36 on 06-18-2002

Page 1

Coefficients of Curve 1

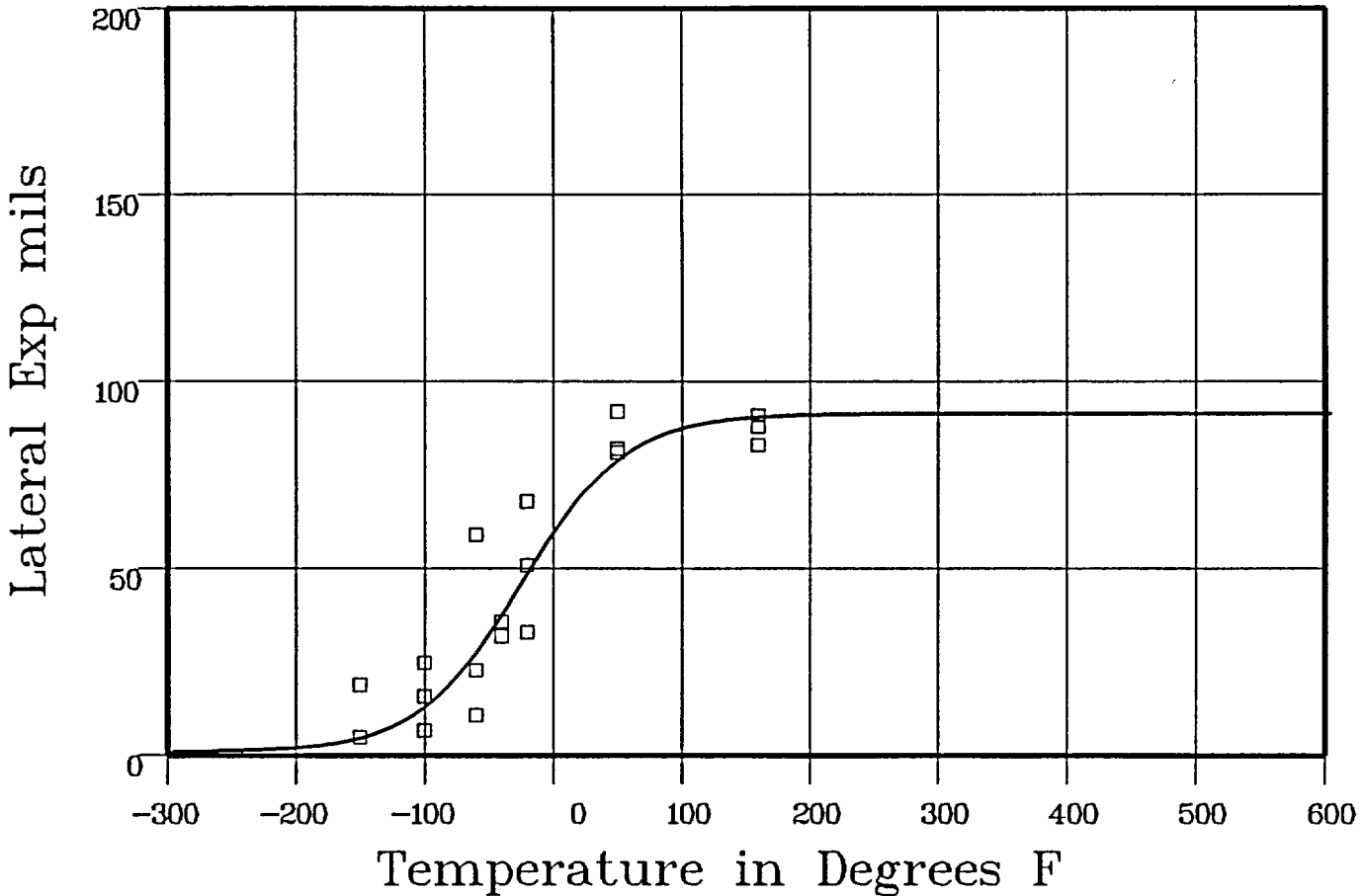
A = 46.27	B = 45.27	C = 81.48	T0 = -29.06
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 91.54      Temperature at LE 35: -49.7      Lower Shelf LE: 1 Fixed

Material: HEAT AFFD ZONE      Heat Number:      Orientation:

Capsule: UNIRR      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3      Cap: UNIRR      Material: HEAT AFFD ZONE      Ori:      Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-150	19	5.42	13.57
-150	5	5.42	-4.2
-100	7	14.5	-7.5
-100	16	14.5	1.49
-100	25	14.5	10.49
-60	59	29.86	29.13
-60	23	29.86	-6.86
-60	11	29.86	-18.86
-40	36	40.23	-4.23

\*\*\*\* Data continued on next page \*\*\*\*

# HEAT AFFECTED ZONE UNIRRADIATED

Page 2

Material: HEAT AFFD ZONE

Heat Number:

Orientation:

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
-40	32	40.23	-8.23
-20	33	51.28	-18.28
-20	68	51.28	16.71
-20	51	51.28	-28
50	92	80.17	11.82
50	82	80.17	1.82
50	81	80.17	.82
160	88	90.67	-2.67
160	83	90.67	-7.67
160	91	90.67	.32

SUM of RESIDUALS = 11.17

# HEAT AFFECTED ZONE CAPSULE T

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 09:58:36 on 06-18-2002

Page 1

Coefficients of Curve 2

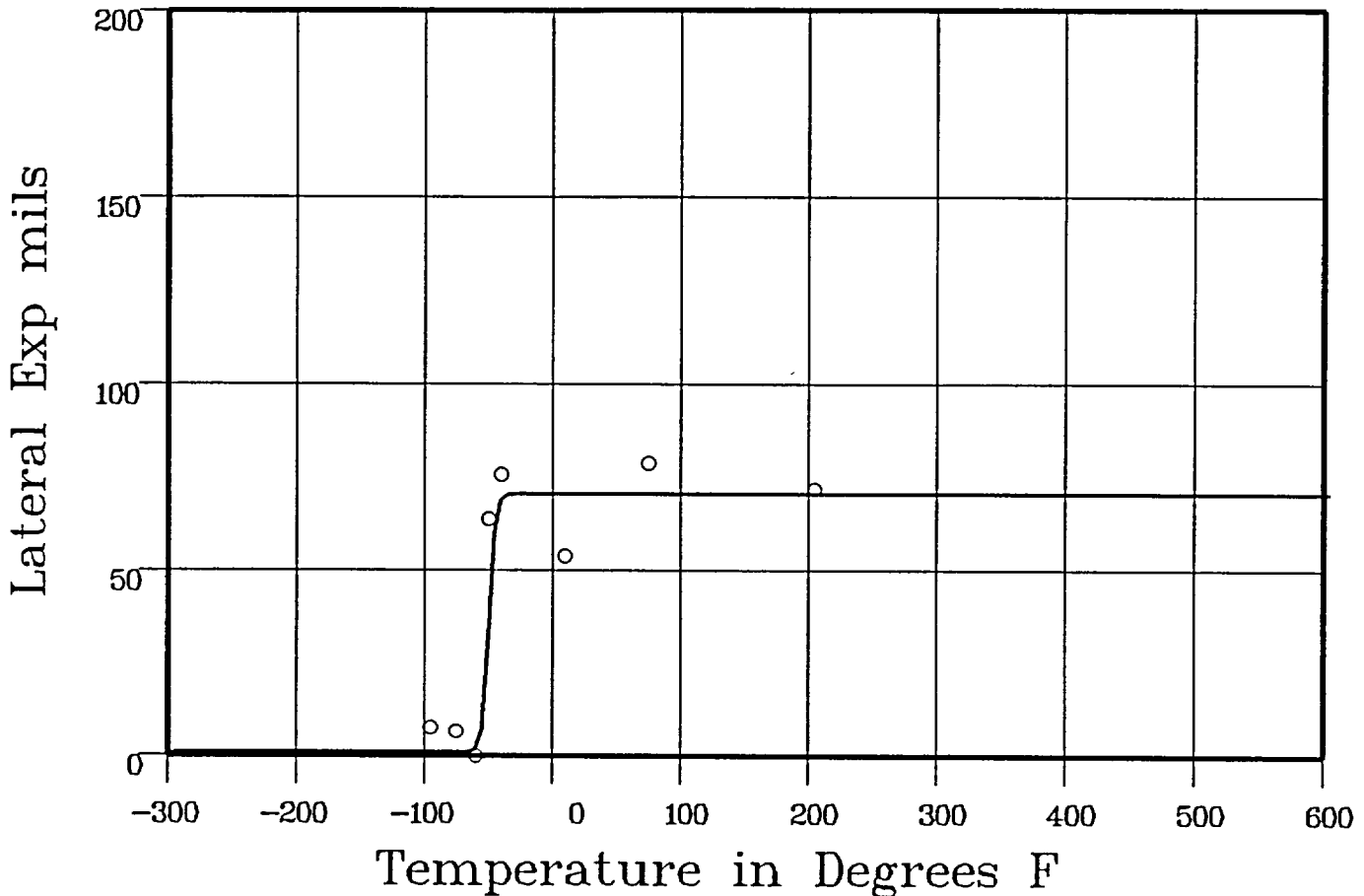
A = 35.86	B = 34.86	C = 4.9	T0 = -54.37
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 70.72      Temperature at LE 35: -54.4      Lower Shelf LE: 1 Fixed

Material: HEAT AFFD ZONE SA5082      Heat Number:      Orientation:

Capsule: T      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: HEAT AFFD ZONE SA5082    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-95	8	1	6.99
-75	7	101	5.98
-60	0	7.39	-7.39
-50	64	60.69	3.3
-40	76	70.52	5.47
10	54	70.72	-16.72
75	79	70.72	8.27
205	72	70.72	1.27

SUM of RESIDUALS = 7.18

# HEAT AFFECTED ZONE CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 09:58:36 on 06-18-2002

Page 1

Coefficients of Curve 3

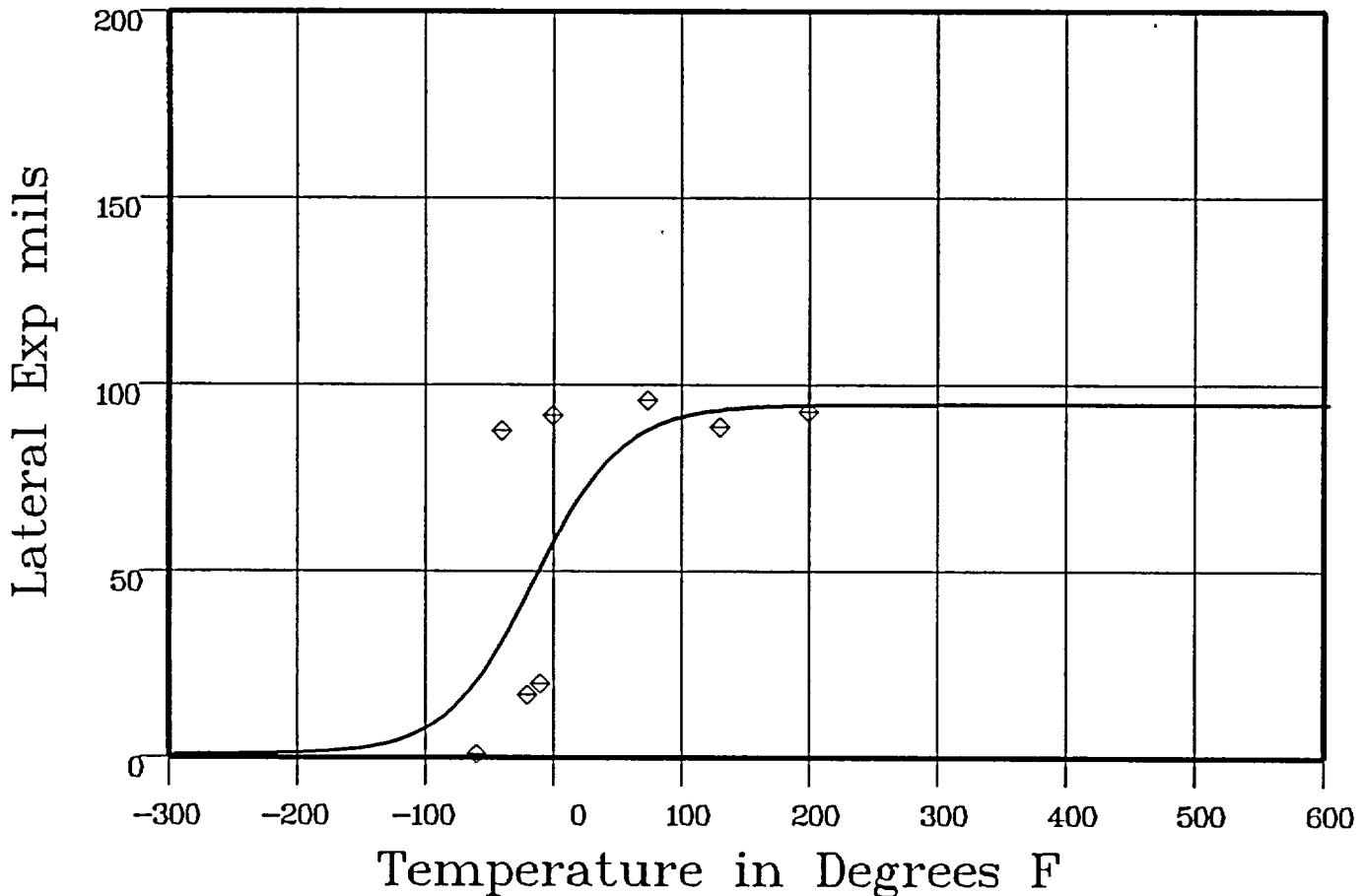
A = 47.88	B = 46.88	C = 68.49	T0 = -19.21
-----------	-----------	-----------	-------------

Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 94.77      Temperature at LE. 35: -385      Lower Shelf LE: 1 Fixed

Material: HEAT AFFD ZONE SA5082      Heat Number:      Orientation:

Capsule: V      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: V    Material: HEAT AFFD ZONE SA5082    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-60	1	22.86	-21.86
-40	88	34.08	53.91
-20	17	47.35	-30.35
-10	20	54.16	-34.16
0	92	60.71	31.28
74	96	88.99	7
130	89	93.59	-4.59
200	93	94.62	-1.62

SUM of RESIDUALS = -37

# HEAT AFFECTED ZONE CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 09:58:36 on 06-18-2002

Page 1

Coefficients of Curve 4

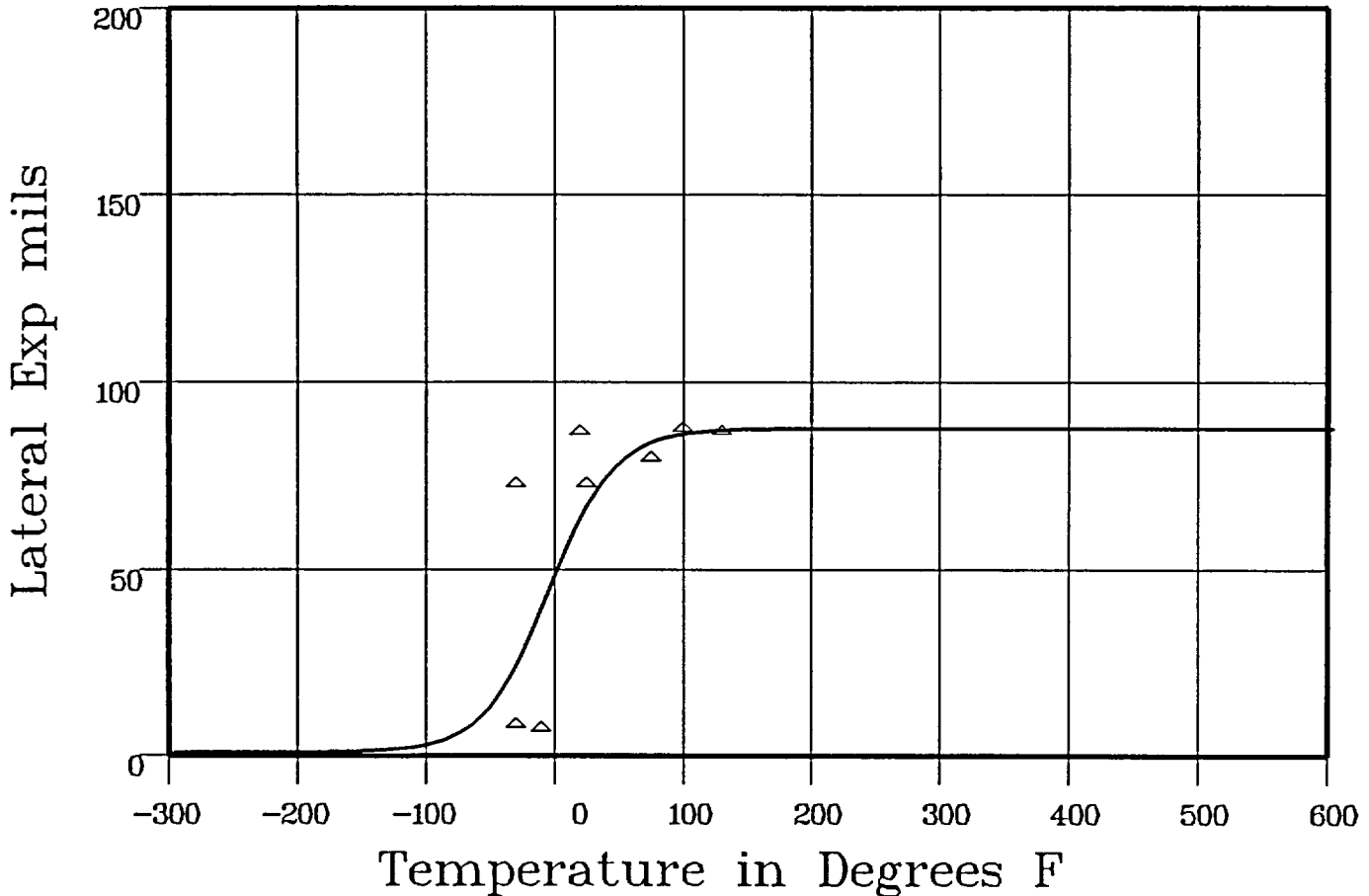
A = 443	B = 433	C = 5146	T0 = -9.37
---------	---------	----------	------------

Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 87.61      Temperature at LE 35: -20.6      Lower Shelf LE: 1 Fixed

Material: HEAT AFFD ZONE      Heat Number:      Orientation:

Capsule: X      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3      Cap: X      Material: HEAT AFFD ZONE      Ori:      Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-30	72	27.82	44.17
-30	8	27.82	-19.82
-10	7	43.78	-36.78
20	86	66.65	19.34
25	72	69.58	2.41
75	79	84.47	-5.47
100	87	86.39	.6

\*\*\*\* Data continued on next page \*\*\*\*

# HEAT AFFECTED ZONE CAPSULE X

Page 2

Material: HEAT AFFD ZONE      Heat Number:      Orientation:  
Capsule: X      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
130	86	8723	-123
			SUM of RESIDUALS = 3.22

# HEAT AFFECTED ZONE UNIRRADIATED

CVGRAPH 41 Hyperbolic Tangent Curve Printed at 10:03:50 on 06-18-2002

Page 1

Coefficients of Curve 1

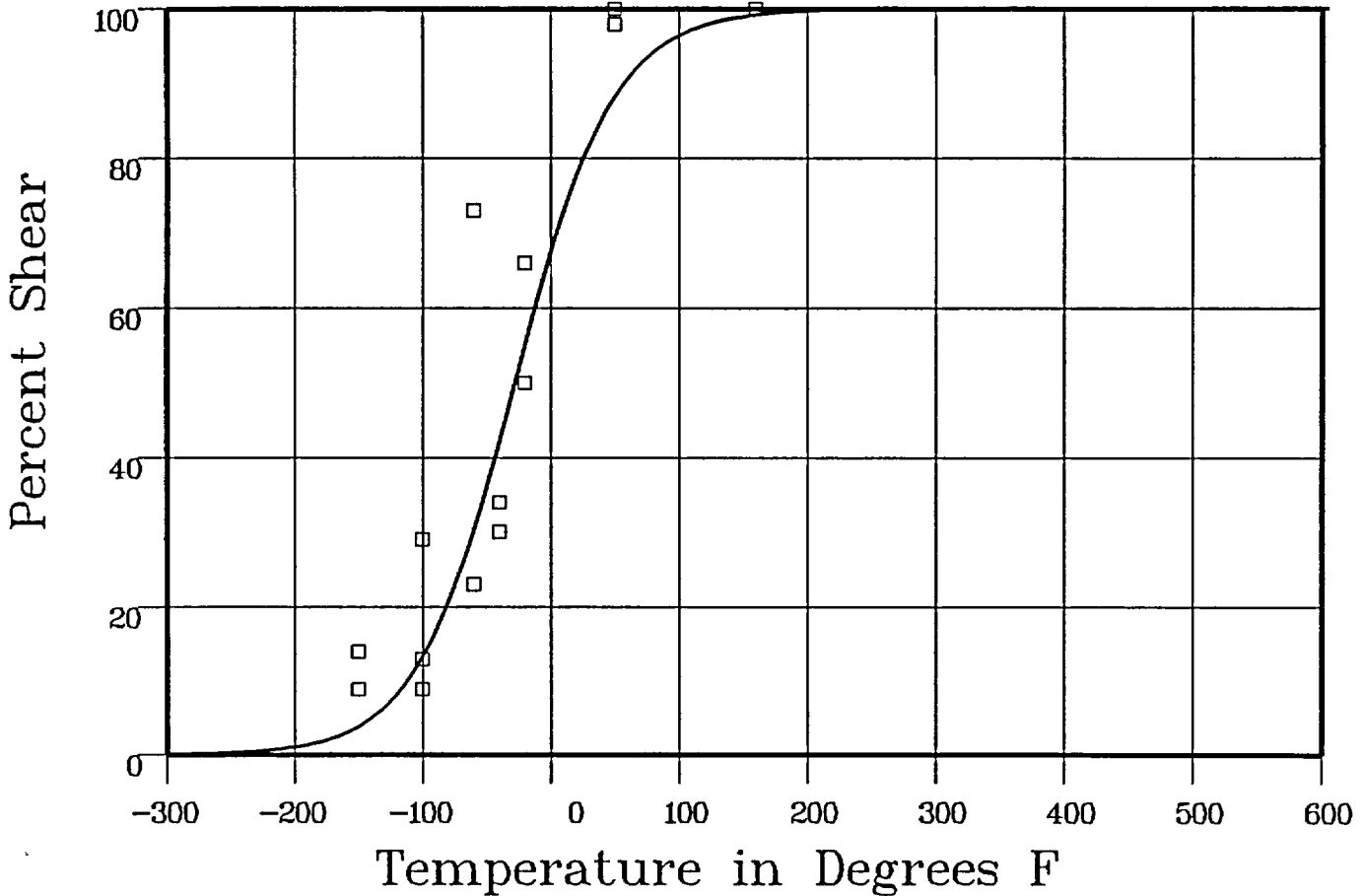
A = 50	B = 50	C = 76.99	T0 = -32.55
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Equation is:  $Shear\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: -32.5

Material: HEAT AFFECTED ZONE      Heat Number:      Orientation:

Capsule: UNIRR      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3      Cap: UNIRR      Material: HEAT AFFECTED ZONE      Ori:      Heat #:

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-150	14	4.51	9.48
-150	9	4.51	4.48
-100	9	14.78	-5.78
-100	13	14.78	-1.78
-100	29	14.78	14.21
-60	73	32.89	40.1
-60	23	32.89	-9.89
-60	23	32.89	-9.89
-40	34	45.18	-11.18

\*\*\*\* Data continued on next page \*\*\*\*

# HEAT AFFECTED ZONE UNIRRADIATED

Page 2

Material: HEAT AFFD ZONE      Heat Number:      Orientation:

Capsule: UNIRR      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-40	30	45.18	-15.18
-20	50	58.08	-8.08
-20	50	58.08	-8.08
-20	66	58.08	7.91
50	98	89.51	8.48
50	100	89.51	10.48
50	100	89.51	10.48
160	100	99.33	.66
160	100	99.33	.66
160	100	99.33	.66

SUM of RESIDUALS = 37.77

# HEAT AFFECTED ZONE CAPSULE T

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:03:50 on 06-18-2002

Page 1

Coefficients of Curve 2

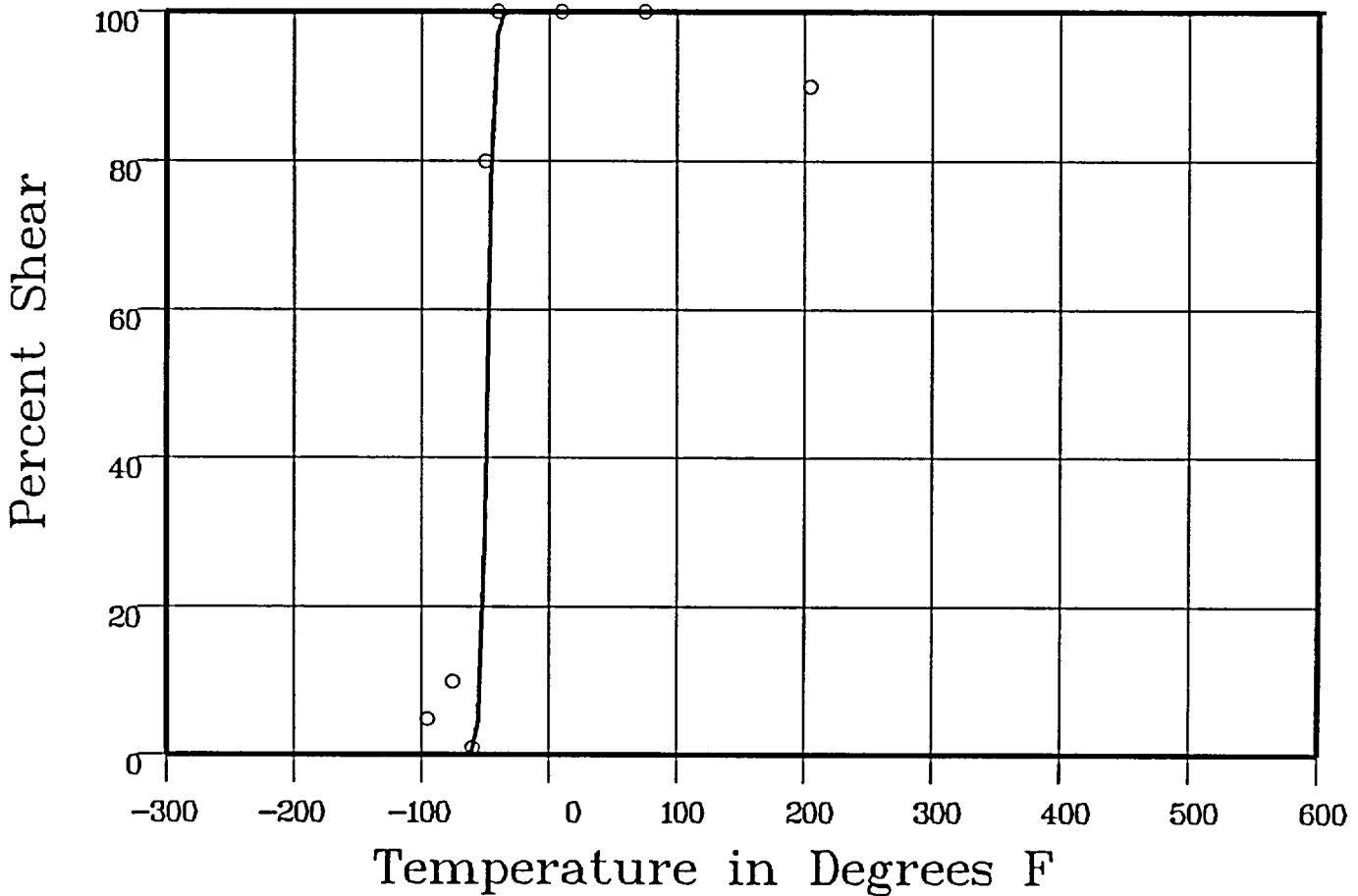
A = 50	B = 50	C = 4.62	T0 = -52.96
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Equation is:  $Shear\% = A + B * [ \tanh((T - T0)/C) ]$

Temperature at 50% Shear: -52.9

Material: HEAT AFFD ZONE SA5082      Heat Number:      Orientation:

Capsule: T      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: HEAT AFFD ZONE SA5082    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-95	5	0	5
-75	10	0	9.99
-60	1	4.56	-3.56
-50	80	78.29	1.7
-40	100	99.63	.36
10	100	100	0
75	100	100	0
205	90	100	-10

SUM of RESIDUALS = 3.49

# HEAT AFFECTED ZONE CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:03:50 on 06-18-2002

Page 1

Coefficients of Curve 3

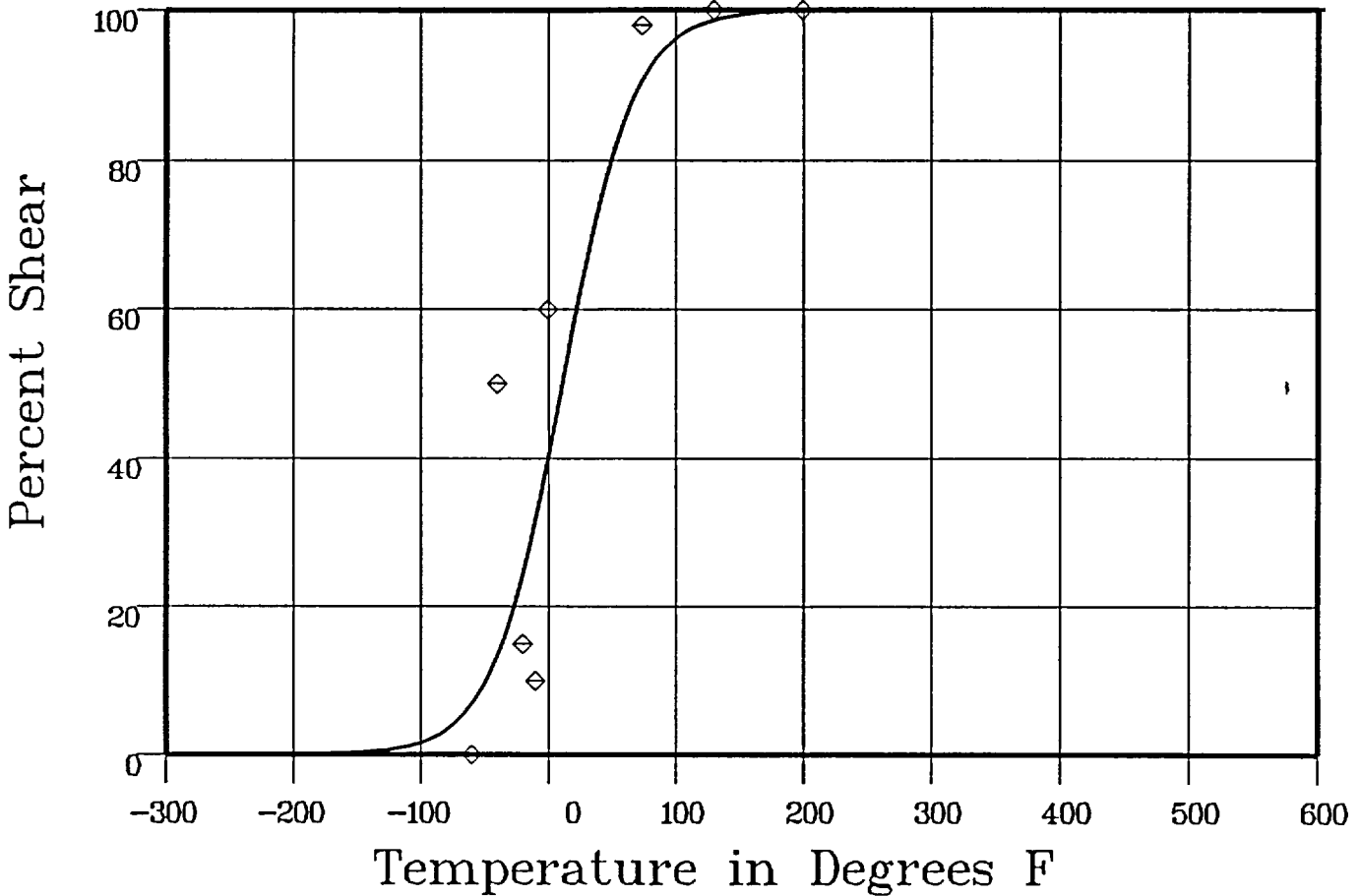
A = 50	B = 50	C = 55.05	T0 = 65.6
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Equation is:  $Shear\% = A + B * [ \tanh((T - T0)/C) ]$

Temperature at 50% Shear: 65

Material: HEAT AFFD ZONE SA5082      Heat Number:      Orientation:

Capsule: V      Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: V    Material: HEAT AFFD ZONE SA5082    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-60	0	8.17	-8.17
-40	50	15.55	34.44
-20	15	27.58	-12.58
-10	10	35.39	-25.39
0	60	44.06	15.93
74	98	92.05	5.94
130	100	98.88	1.11
200	100	99.91	.08

SUM of RESIDUALS = 11.36

# HEAT AFFECTED ZONE CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:03:50 on 06-18-2002

Page 1

Coefficients of Curve 4

A = 50	B = 50	C = 90.53	T0 = -11.71
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: -11.7

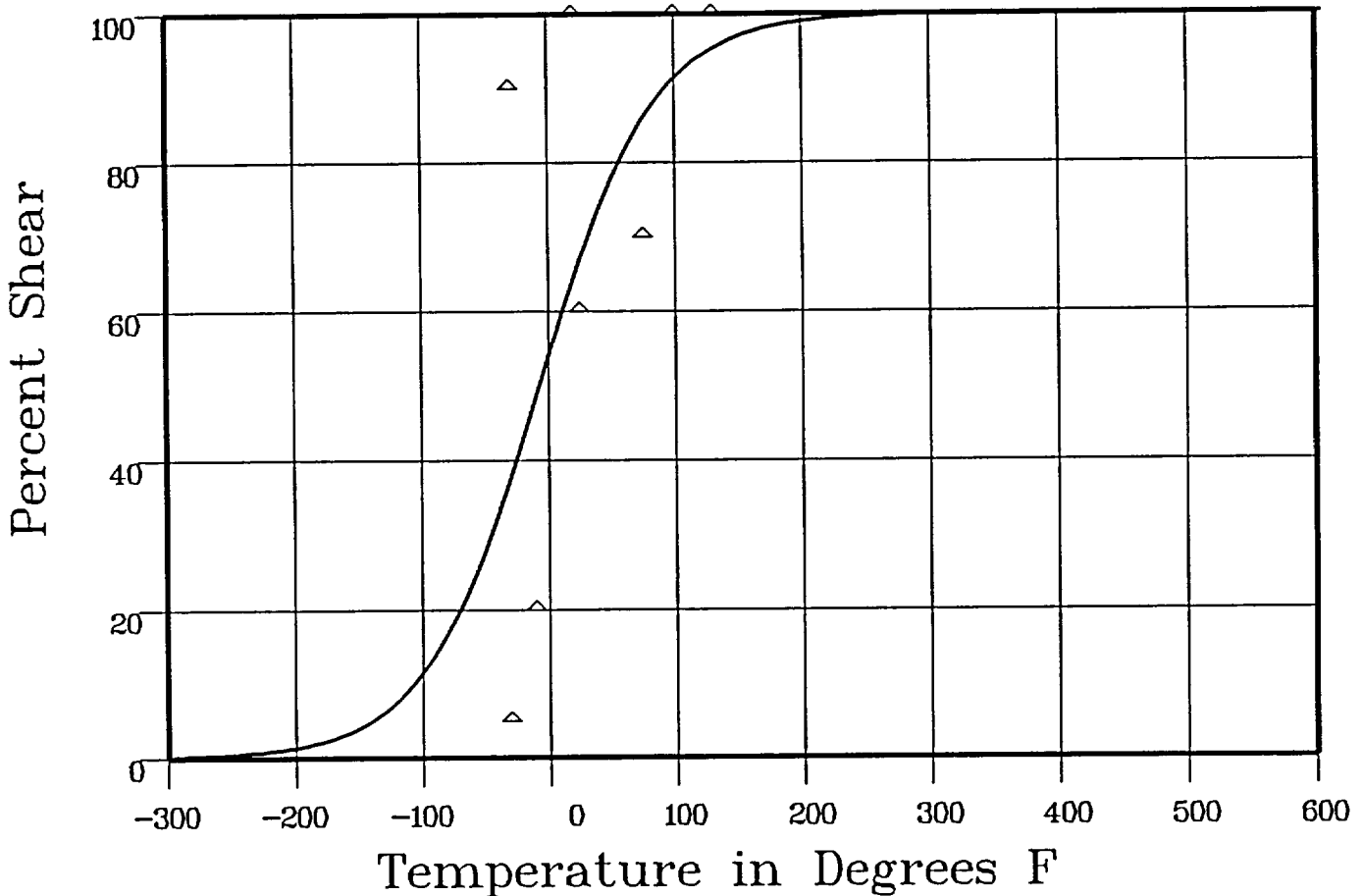
Material: HEAT AFFECTED ZONE

Heat Number:

Orientation:

Capsule: X

Total Fluence:



Data Set(s) Plotted

Plant: TP3

Cap: X

Material: HEAT AFFECTED ZONE

Ori:

Heat #:

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-30	90	40.03	49.96
-30	5	40.03	-35.03
-10	20	50.94	-30.94
20	100	66.83	33.16
25	60	69.23	-9.23
75	70	87.16	-17.16
100	100	92.18	7.81

\*\*\*\* Data continued on next page \*\*\*\*

# HEAT AFFECTED ZONE CAPSULE X

Page 2

Material: HEAT AFFD ZONE      Heat Number:      Orientation:  
Capsule: X      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
130	100	95.81	4.18
			SUM of RESIDUALS = 2.73

# STANDARD REFERENCE MATERIAL UNIRRADIATED

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:23:35 on 06-18-2002

Page 1

Coefficients of Curve 1

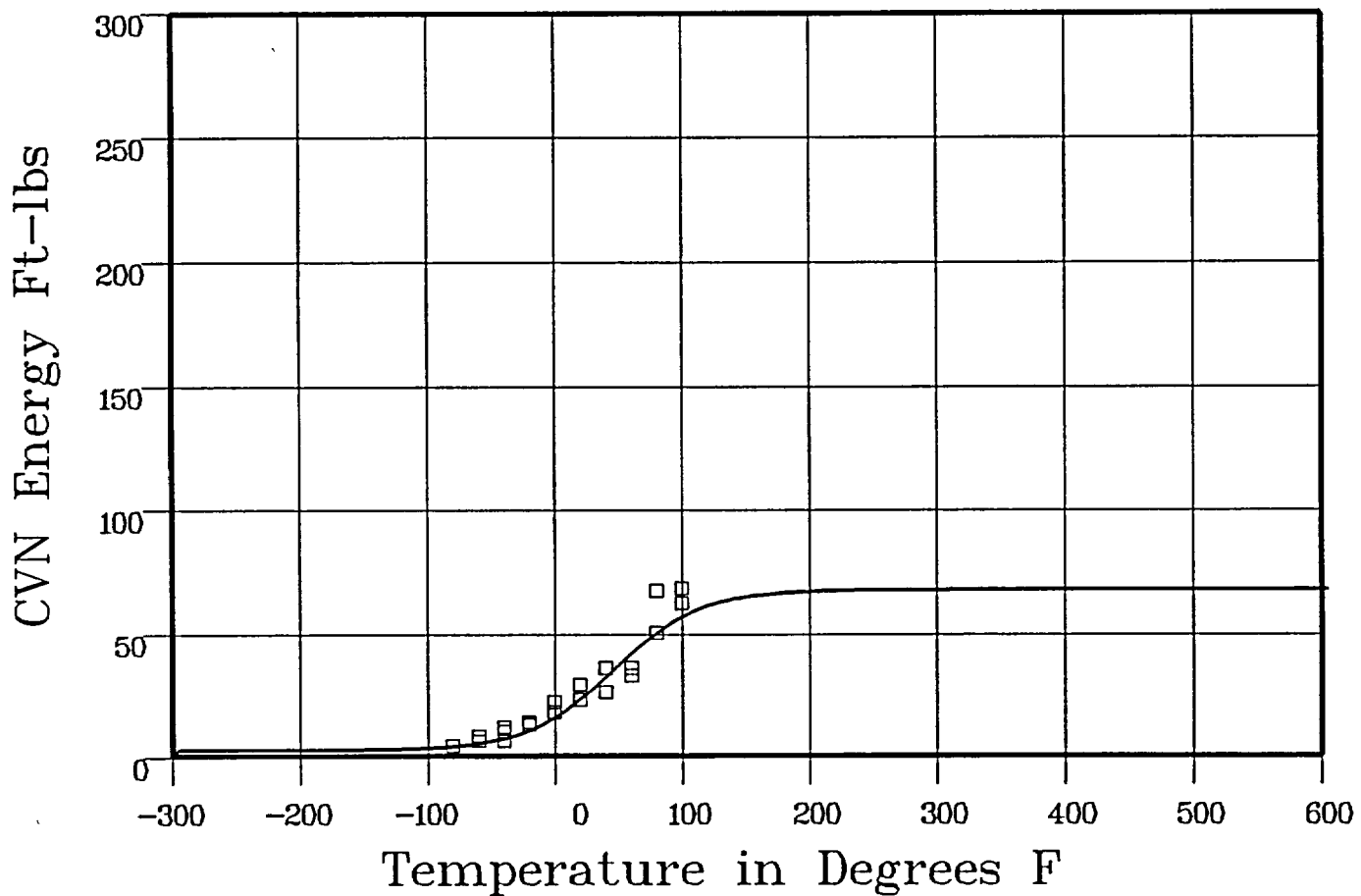
A = 34.84	B = 32.65	C = 68.21	T0 = 40.31
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 67.5 Fixed    Temp. at 30 ft-lbs: 30.1    Temp. at 50 ft-lbs: 74.5    Lower Shelf Energy: 2.19 Fixed

Material: SRM SA302B    Heat Number:    Orientation:

Capsule: UNIRR    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: UNIRR    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
-80	4	4.06	-0.06
-80	4	4.06	-0.06
-60	6	5.47	.52
-60	8	5.47	2.52
-40	10	7.86	2.13
-40	6	7.86	-1.86
-40	12	7.86	4.13
-20	13	11.71	1.28
-20	14	11.71	2.28

\*\*\*\* Data continued on next page \*\*\*\*

# STANDARD REFERENCE MATERIAL UNIRRADIATED

Page 2

Material: SRM SA302B      Heat Number:      Orientation:

Capsule: UNIRR      Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input CVN Energy	Computed CVN Energy	Differential
0	18	17.52	.47
0	22	17.52	4.47
20	23	25.4	-2.4
20	29	25.4	3.59
40	36	34.7	1.29
40	26	34.7	-8.7
60	36	44.02	-8.02
60	33	44.02	-11.02
80	50	51.95	-1.95
80	67	51.95	15.04
100	62	57.83	4.16
100	68	57.83	10.16
			SUM of RESIDUALS = 18.02

# STANDARD REFERENCE MATERIAL CAPSULE S

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:23:35 on 06-18-2002

Page 1

Coefficients of Curve 2

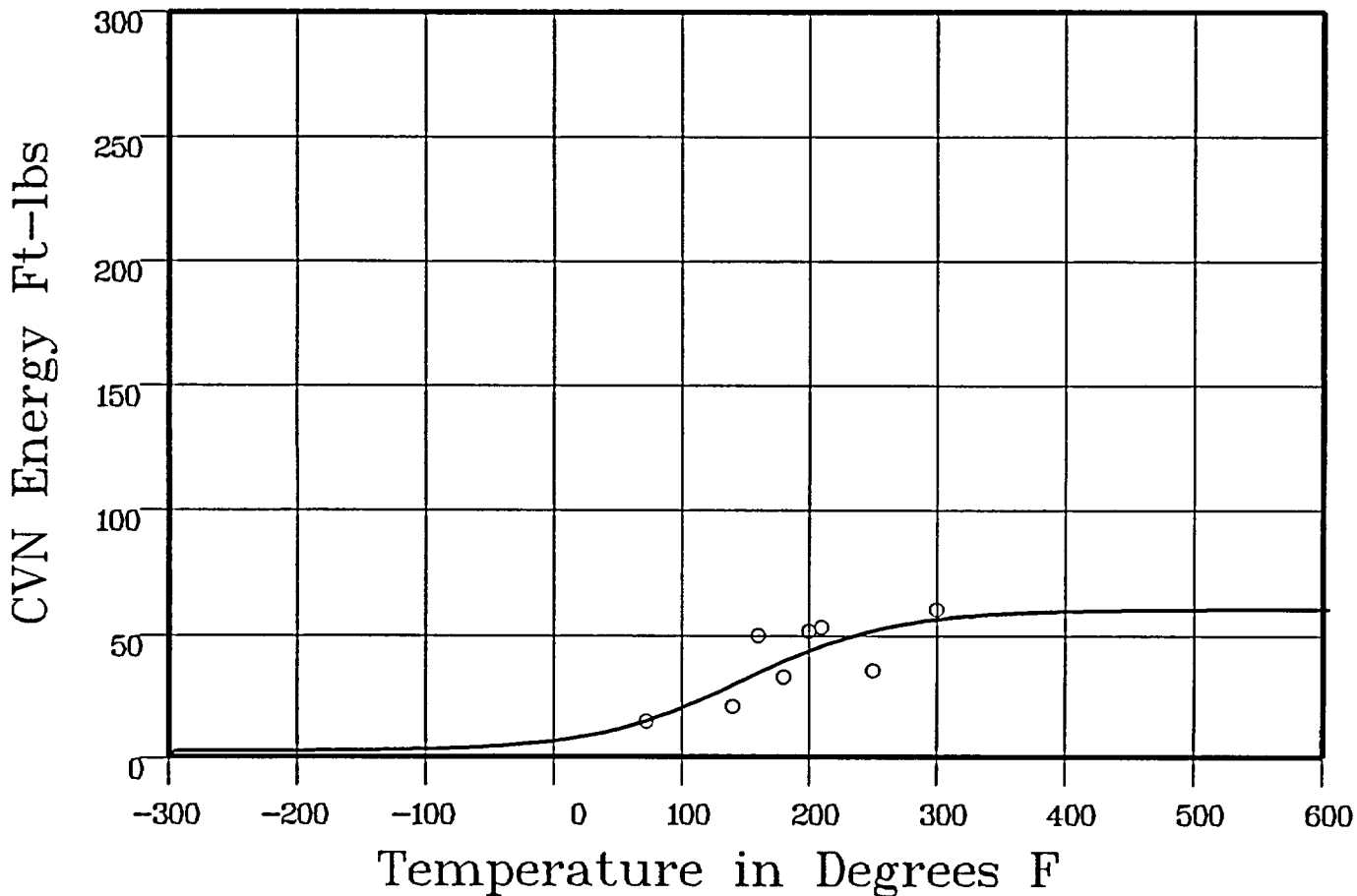
A = 31.1	B = 2889	C = 118.31	T0 = 141.21
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 60 Fixed    Temp. at 30 ft-lbs: 136.7    Temp. at 50 ft-lbs: 233.7    Lower Shelf Energy: 2.2 Fixed

Material: SRM SA302B    Heat Number:    Orientation:

Capsule: S    Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: S    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
72	15	15.89	-0.89
140	21	30.8	-9.8
160	49.5	35.65	13.84
180	33	40.24	-7.24
200	51.5	44.38	7.11
210	53	46.23	6.76
250	35.5	52.07	-16.57
300	60	56.3	3.69

SUM of RESIDUALS = -3.09

# STANDARD REFERENCE MATERIAL CAPSULE T

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:23:35 on 06-18-2002

Page 1

Coefficients of Curve 3

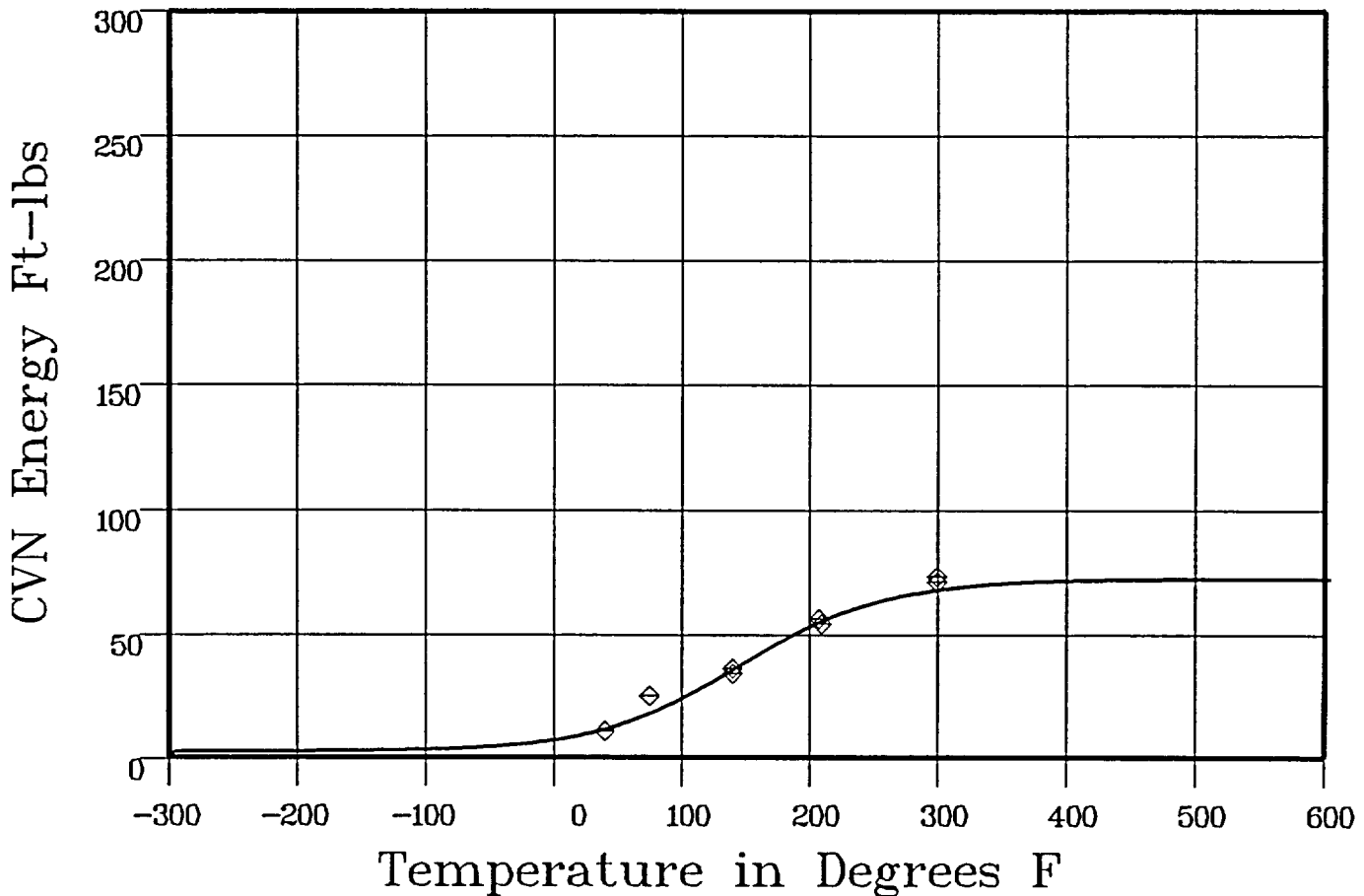
A = 37.09	B = 34.9	C = 114.13	T0 = 140.31
-----------	----------	------------	-------------

Equation is:  $CVN = A + B * | \tanh((T - T0)/C) |$

Upper Shelf Energy: 72 Fixed    Temp. at 30 ft-lbs: 116.7    Temp. at 50 ft-lbs: 184.5    Lower Shelf Energy: 2.19 Fixed

Material: SRM SA302B    Heat Number:    Orientation:

Capsule: T    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
40	11	12.46	-1.46
75	25	19.05	5.94
140	34	37	-3
140	36	37	-1
208	56	55.66	.33
210	54	56.1	-2.1
300	73	67.99	5
300	71	67.99	3

SUM of RESIDUALS = 6.71

# STANDARD REFERENCE MATERIAL CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:23:35 on 06-18-2002

Page 1

Coefficients of Curve 4

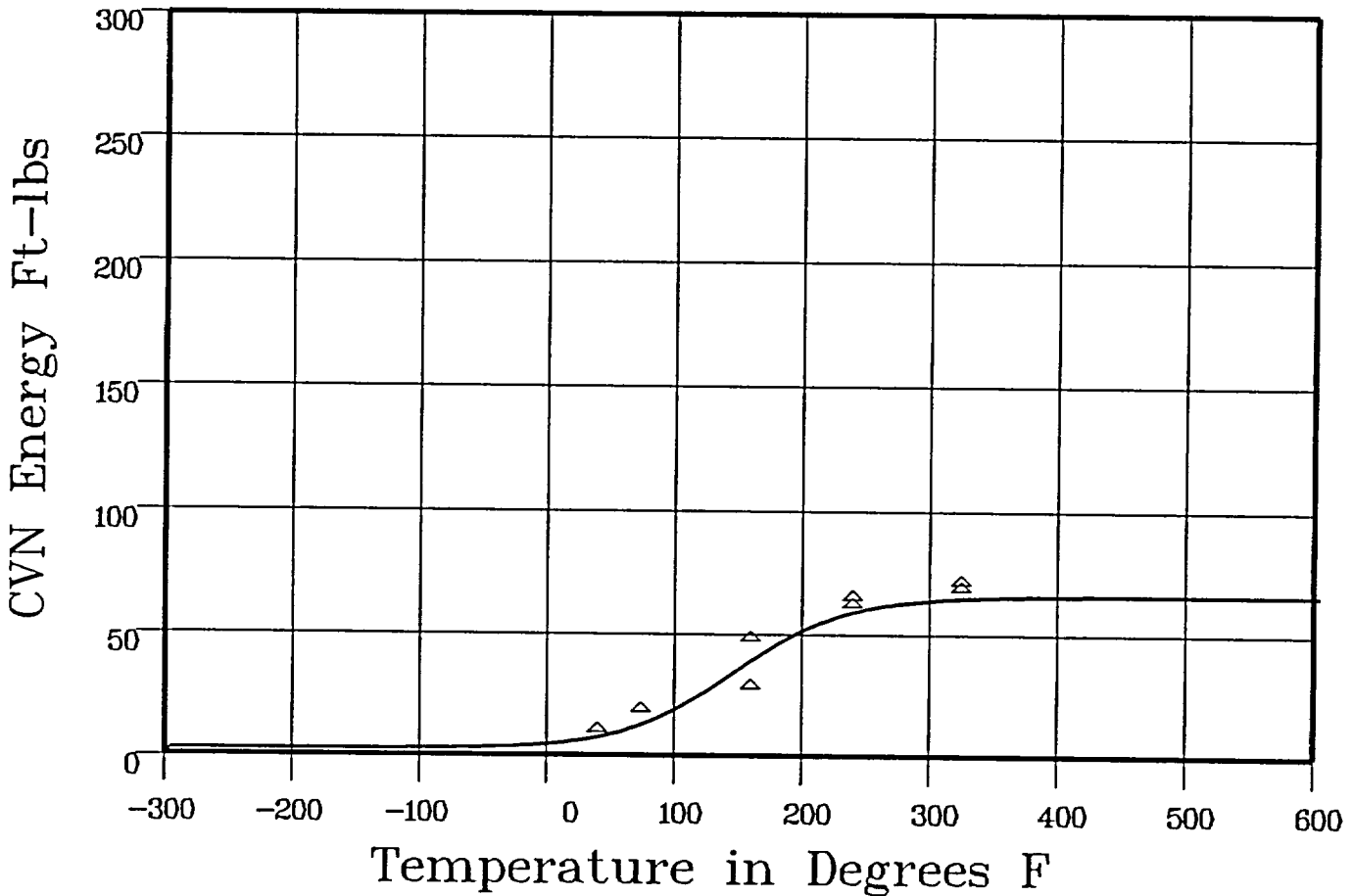
A = 33.89	B = 3169	C = 89.56	T0 = 141.5
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 65.59 Fixed    Temp. at 30 ft-lbs: 130.4    Temp. at 50 ft-lbs: 191.6    Lower Shelf Energy: 2.19 Fixed

Material: SRM SA302B    Heat Number:    Orientation:

Capsule: V    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: V    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
40	95	8.15	134
74	18	13.69	4.3
160	27.5	40.35	-12.85
160	47	40.35	6.64
240	64	59.27	4.72
240	61	59.27	1.72
325	67.5	64.56	2.93

\*\*\*\* Data continued on next page \*\*\*\*

STANDARD REFERENCE MATERIAL CAPSULE V

Page 2

Material: SRM SA302B

Heat Number:

Orientation:

Capsule: V

Total Fluence:

Charpy V-Notch Data (Continued)

Temperature  
325

Input CVN Energy  
70

Computed CVN Energy  
64.56

Differential  
5.43

SUM of RESIDUALS = 14.26

# STANDARD REFERENCE MATERIAL CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:23:35 on 06-18-2002

Page 1

Coefficients of Curve 5

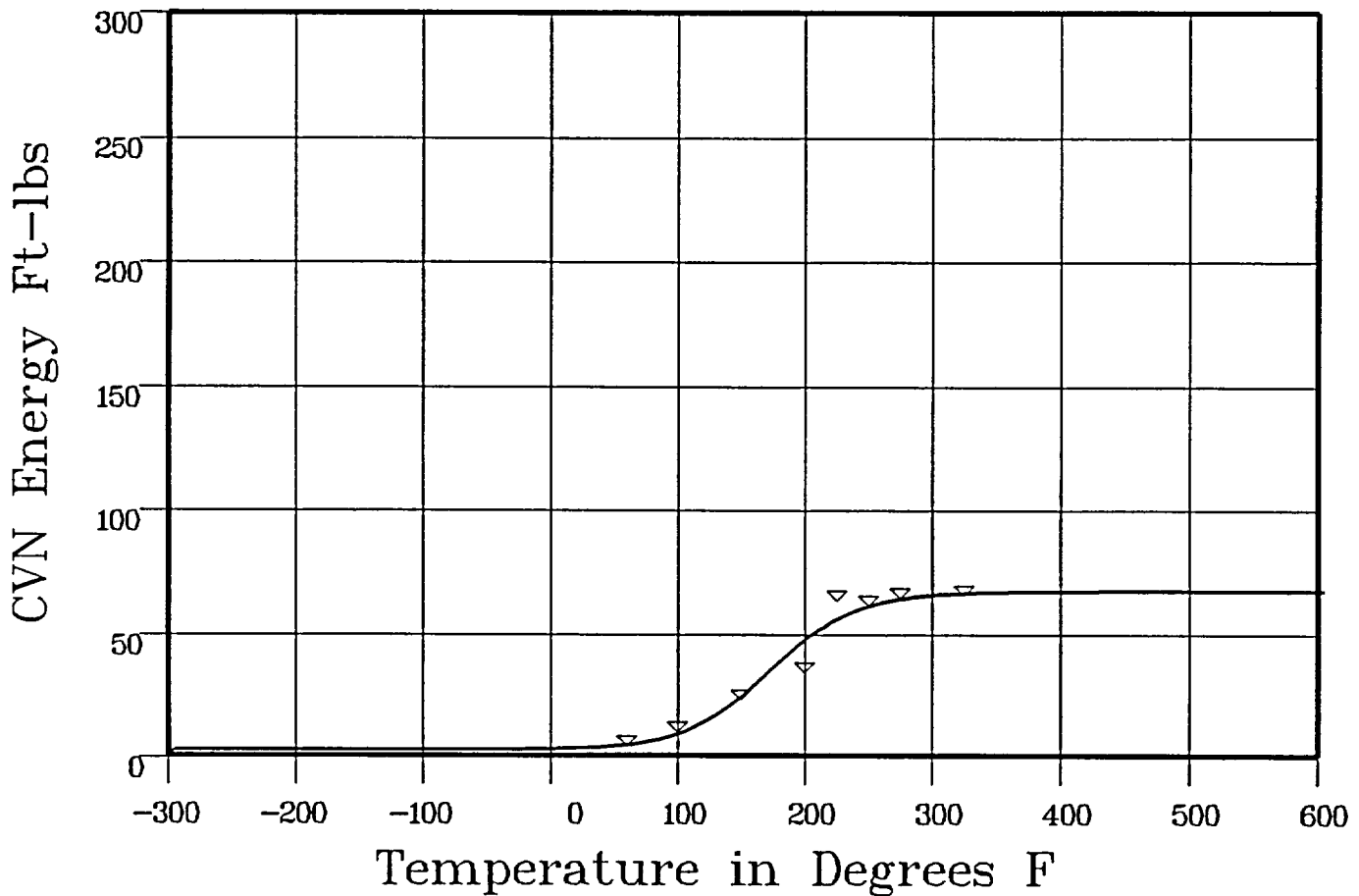
A = 3459	B = 324	C = 68.3	T0 = 166.73
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Equation is:  $CVN = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf Energy: 67 Fixed    Temp. at 30 ft-lbs: 156.9    Temp. at 50 ft-lbs: 202    Lower Shelf Energy: 2.19 Fixed

Material: SRM SA302B    Heat Number:    Orientation:

Capsule: X    Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: X    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input CVN Energy	Computed CVN Energy	Differential
60	8	4.92	3.07
100	14	10.24	3.75
150	27	26.81	.18
200	38	49.24	-11.24
225	67	57.04	9.95
250	65	61.79	3.2

\*\*\*\* Data continued on next page \*\*\*\*

# STANDARD REFERENCE MATERIAL CAPSULE X

Page 2

Material: SRM SA302B

Heat Number:

Orientation:

Capsule: X

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature  
275  
325

Input CVN Energy  
68  
69

Computed CVN Energy  
64.38  
66.37

Differential  
3.61  
2.62

SUM of RESIDUALS = 15.16

# STANDARD REFERENCE MATERIAL UNIRRADIATED

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:36:08 on 06-18-2002

Page 1

Coefficients of Curve 1

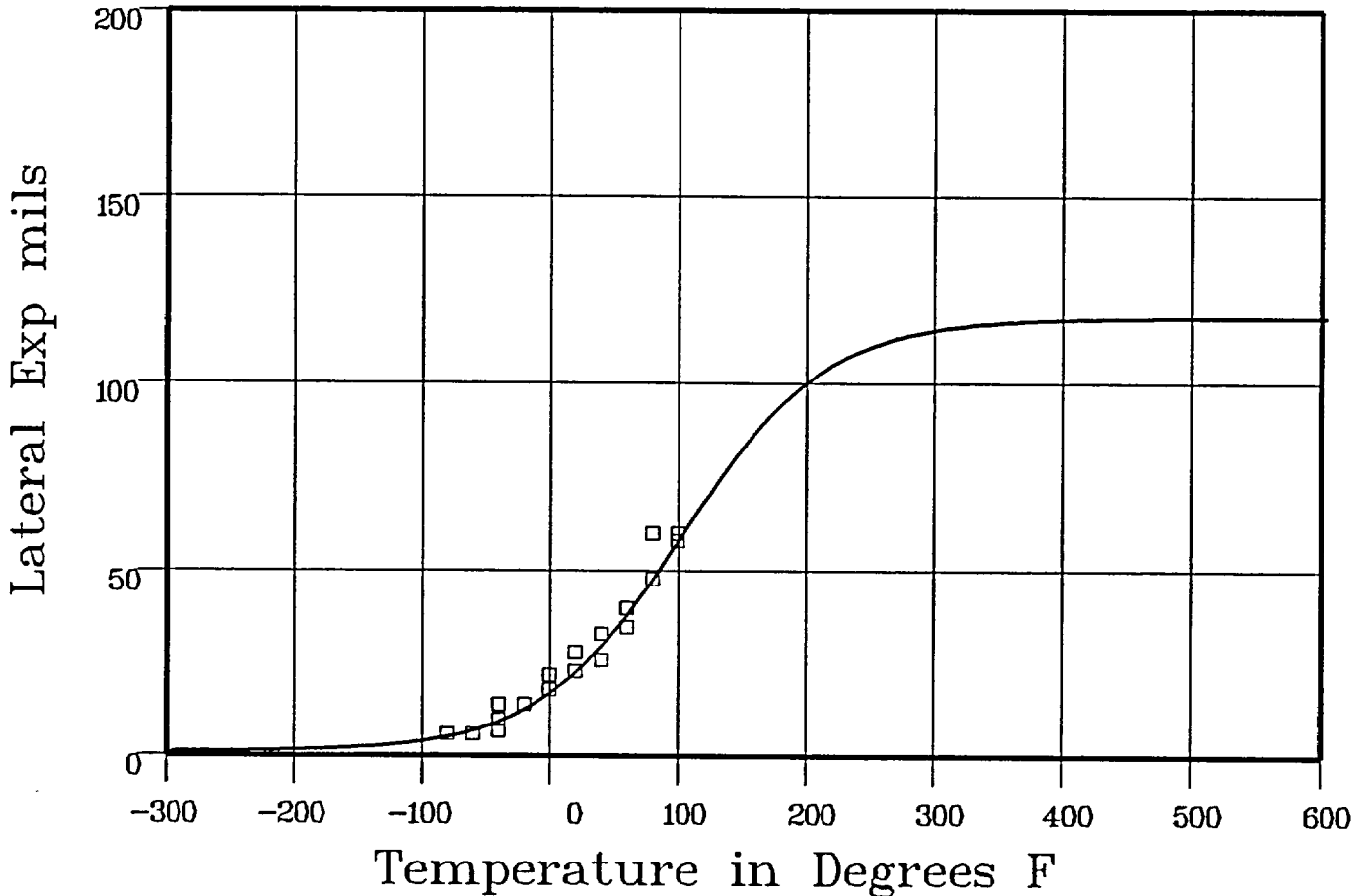
A = 59.36	B = 58.36	C = 11252	T0 = 98.14
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Equation is:  $LE = A + B * [ \tanh((T - T0)/C) ]$

Upper Shelf LE: 117.73      Temperature at LE 35: 481      Lower Shelf LE: 1 Fixed

Material: SRM SA302B      Heat Number:      Orientation:

Capsule: UNIRR      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: UNIRR    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
-80	6	5.72	27
-80	6	5.72	27
-60	6	7.62	-1.62
-60	6	7.62	-1.62
-40	10	10.22	-22
-40	7	10.22	-3.22
-40	14	10.22	3.77
-20	14	13.73	26
-20	14	13.73	26

\*\*\*\* Data continued on next page \*\*\*\*

# STANDARD REFERENCE MATERIAL UNIRRADIATED

Page 2

Material: SRM SA302B

Heat Number:

Orientation:

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
0	18	18.36	-36
0	22	18.36	3.63
20	23	24.29	-1.29
20	28	24.29	3.7
40	33	31.63	1.36
40	26	31.63	-5.63
60	40	40.3	-3
60	35	40.3	-5.3
80	48	50.03	-2.03
80	60	50.03	9.96
100	58	60.33	-2.33
100	60	60.33	-33
SUM of RESIDUALS =			-79

# STANDARD REFERENCE MATERIAL CAPSULE S

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:36:08 on 06-18-2002

Page 1

Coefficients of Curve 2

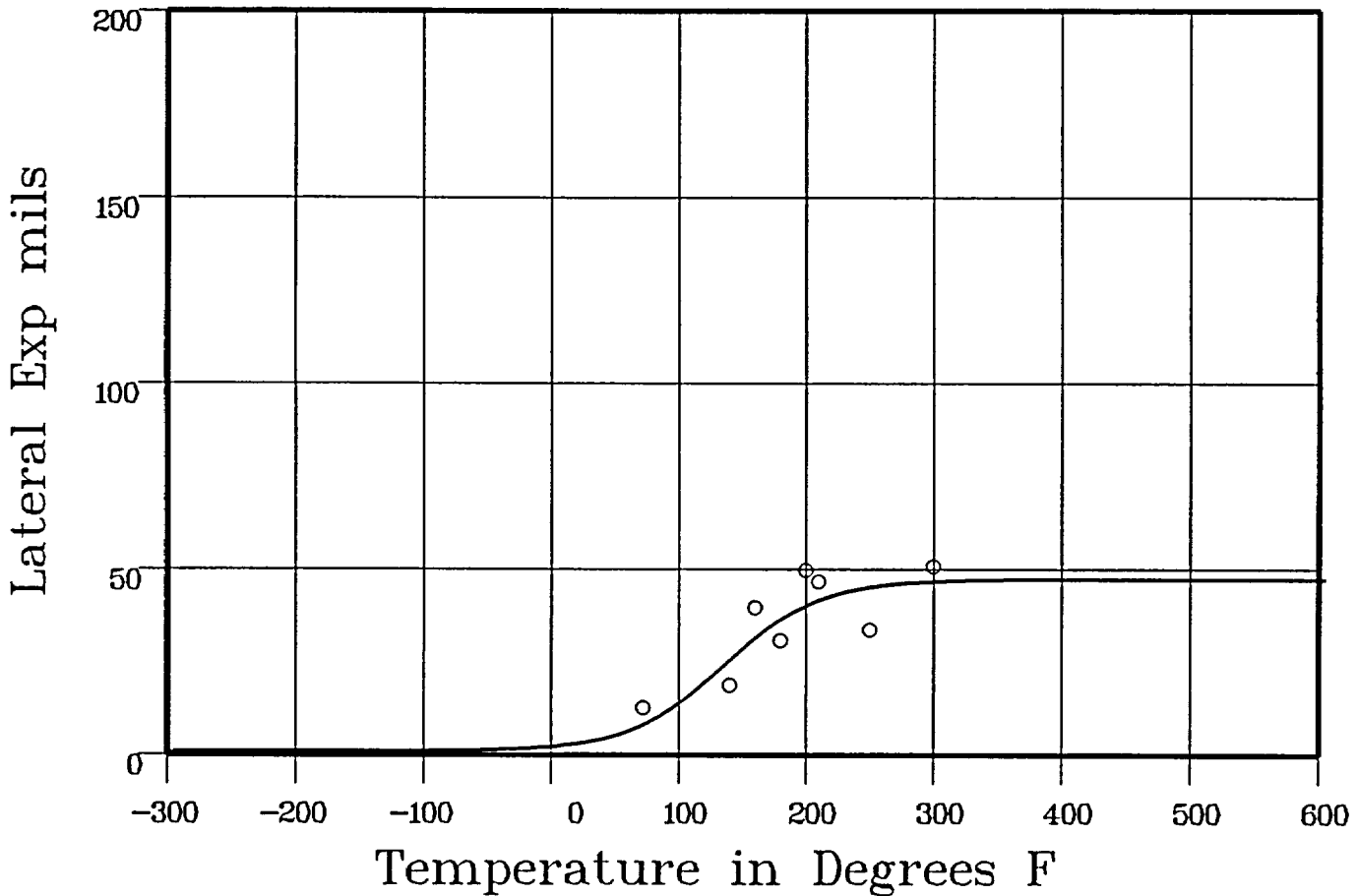
A = 2424	B = 2324	C = 75.45	T0 = 130.31
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 47.48      Temperature at LE 35: 168.1      Lower Shelf LE: 1 Fixed

Material: SRM SA302B      Heat Number:      Orientation:

Capsule: S      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: S    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
72	13	9.16	3.83
140	19	27.2	-8.2
160	40	32.94	7.05
180	31	37.66	-6.66
200	50	41.15	8.84
210	47	42.46	4.53
250	34	45.61	-11.61
300	51	46.97	4.02

SUM of RESIDUALS = 1.81

# STANDARD REFERENCE MATERIAL CAPSULE T

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:36:08 on 06-18-2002

Page 1

Coefficients of Curve 3

A = 2924	B = 2824	C = 125.08	T0 = 153.75
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 57.49

Temperature at LE 35: 179.5

Lower Shelf LE: 1 Fixed

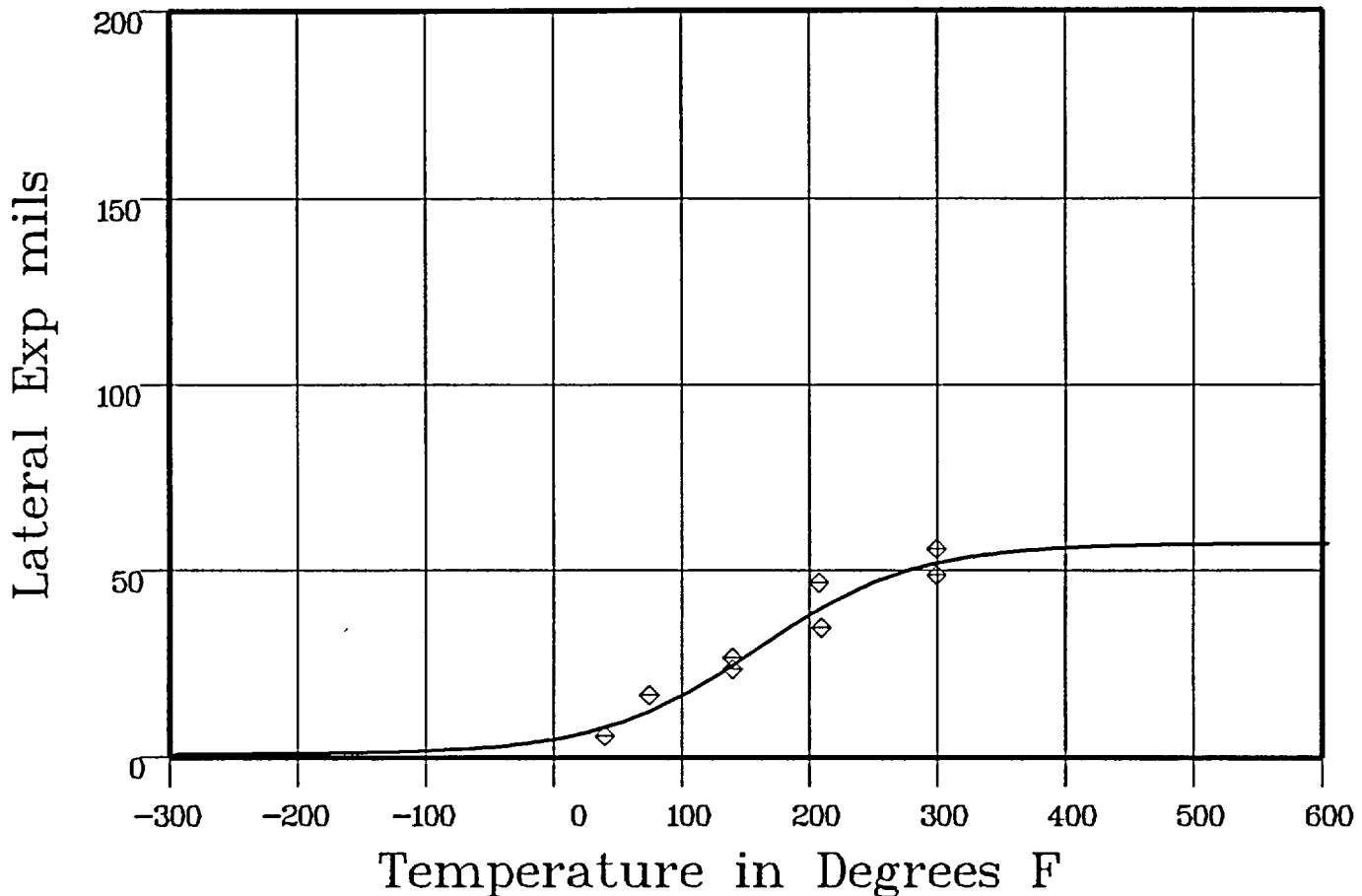
Material: SRM SA302B

Heat Number:

Orientation:

Capsule: T

Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
40	6	8.88	-2.88
75	17	13.49	3.5
140	24	26.15	-2.15
140	27	26.15	.84
208	47	40.78	6.21
210	35	41.15	-6.15
300	56	52.52	3.47
300	49	52.52	-3.52

SUM of RESIDUALS = -.66

# STANDARD REFERENCE MATERIAL CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:36:08 on 06-18-2002

Page 1

Coefficients of Curve 4

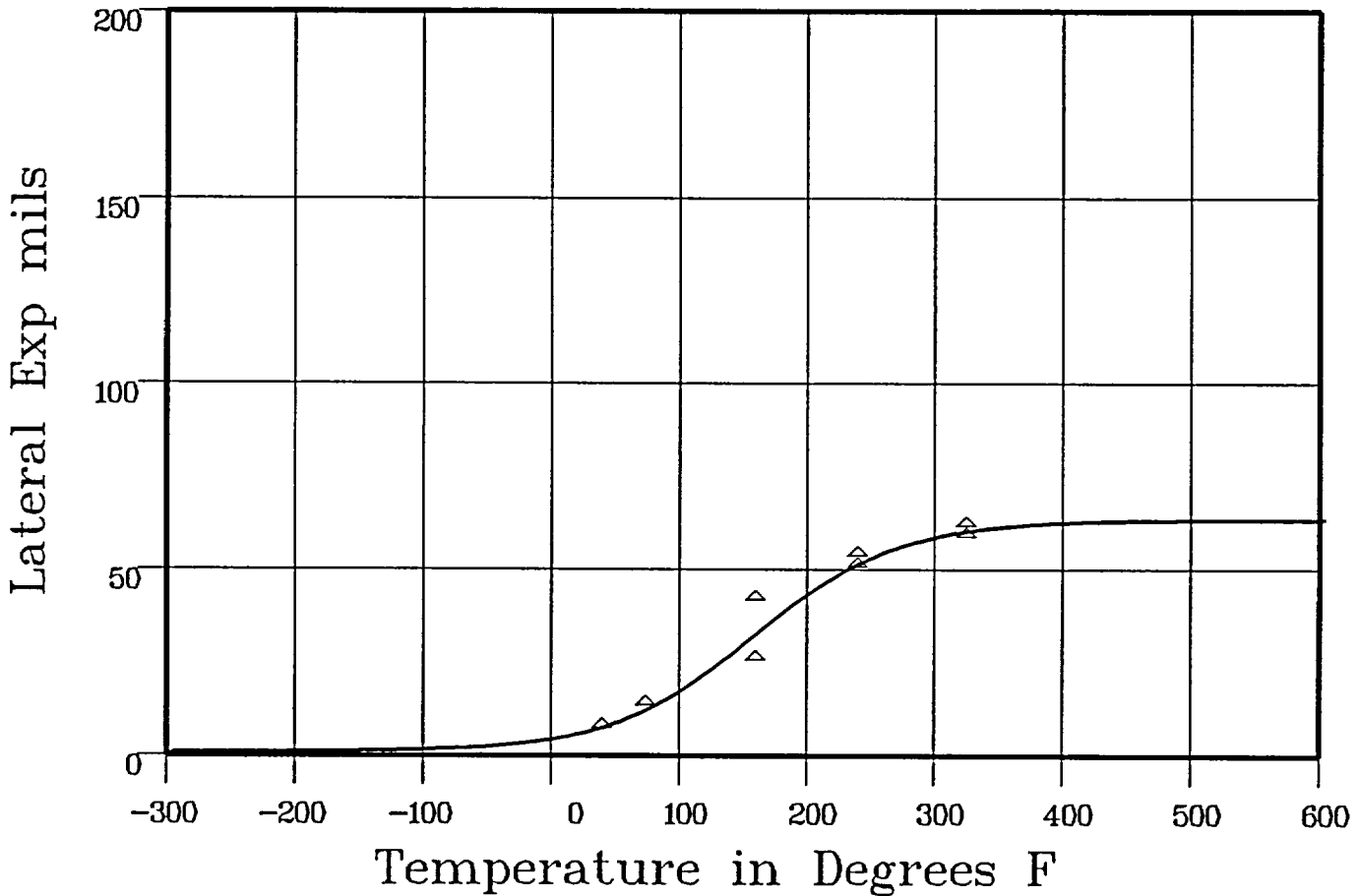
A = 32.28	B = 31.28	C = 113.47	T0 = 153.44
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Equation is:  $LE = A + B * [ \tanh((T - T_0)/C) ]$

Upper Shelf LE: 63.57      Temperature at LE 35: 163.3      Lower Shelf LE: 1 Fixed

Material: SRM SA302B      Heat Number:      Orientation:

Capsule: V      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: V    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed LE	Differential
40	8	8.46	-46
74	14	13.37	.62
160	26	34.09	-8.09
160	42	34.09	7.9
240	51	52.39	-1.39
240	54	52.39	1.6
325	59	60.67	-1.67

\*\*\*\* Data continued on next page \*\*\*\*

# STANDARD REFERENCE MATERIAL CAPSULE V

Page 2

Material: SRM SA302B

Heat Number:

Orientation:

Capsule: V

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature  
325

Input Lateral Expansion  
62

Computed L.E.  
60.67

Differential  
1.32

SUM of RESIDUALS = -15

# STANDARD REFERENCE MATERIAL CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:36:08 on 06-18-2002

Page 1

Coefficients of Curve 5

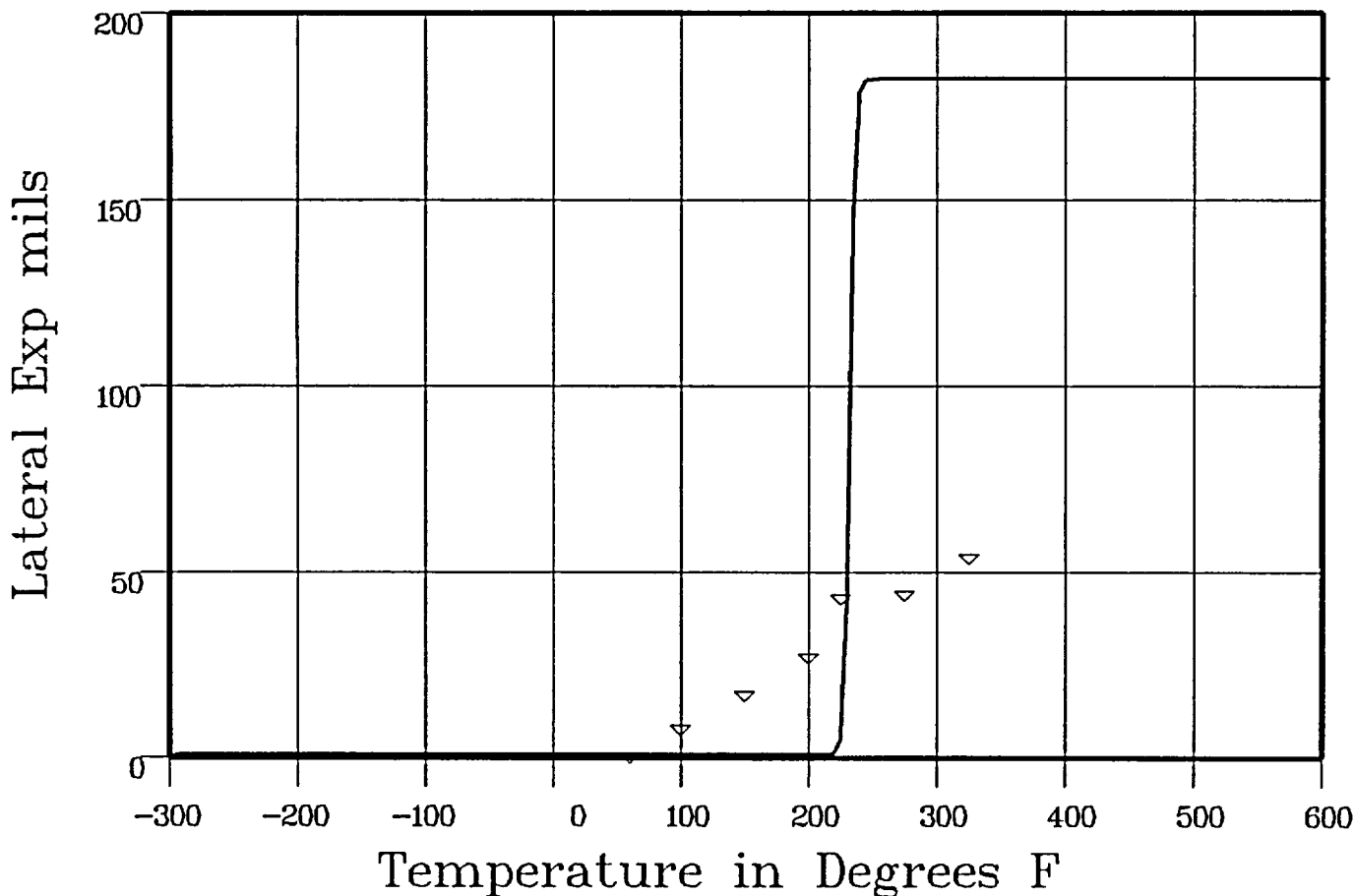
A = 9168	B = 90.68	C = 3.87	T0 = 227.34
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Equation is:  $LE = A + B * [ \tanh((T - T0)/C) ]$

Upper Shelf LE: 182.37      Temperature at LE 35: 224.5      Lower Shelf LE: 1 Fixed

Material: SRM SA302B      Heat Number:      Orientation:

Capsule: X      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: X    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Lateral Expansion	Computed L.E.	Differential
60	1	1	0
100	9	1	8
150	18	1	17
200	28	1	26.99
225	44	42.7	1.29
250	447	182.36	264.63

\*\*\*\* Data continued on next page \*\*\*\*

# STANDARD REFERENCE MATERIAL CAPSULE X

Page 2

Material: SRM SA302B

Heat Number:

Orientation:

Capsule: X

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Lateral Expansion	Computed L.E.	Differential
275	45	182.37	-137.37
325	55	182.37	-127.37

SUM of RESIDUALS = 53.18

# STANDARD REFERENCE MATERIAL UNIRRADIATED

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:49:13 on 06-18-2002

Page 1

Coefficients of Curve 1

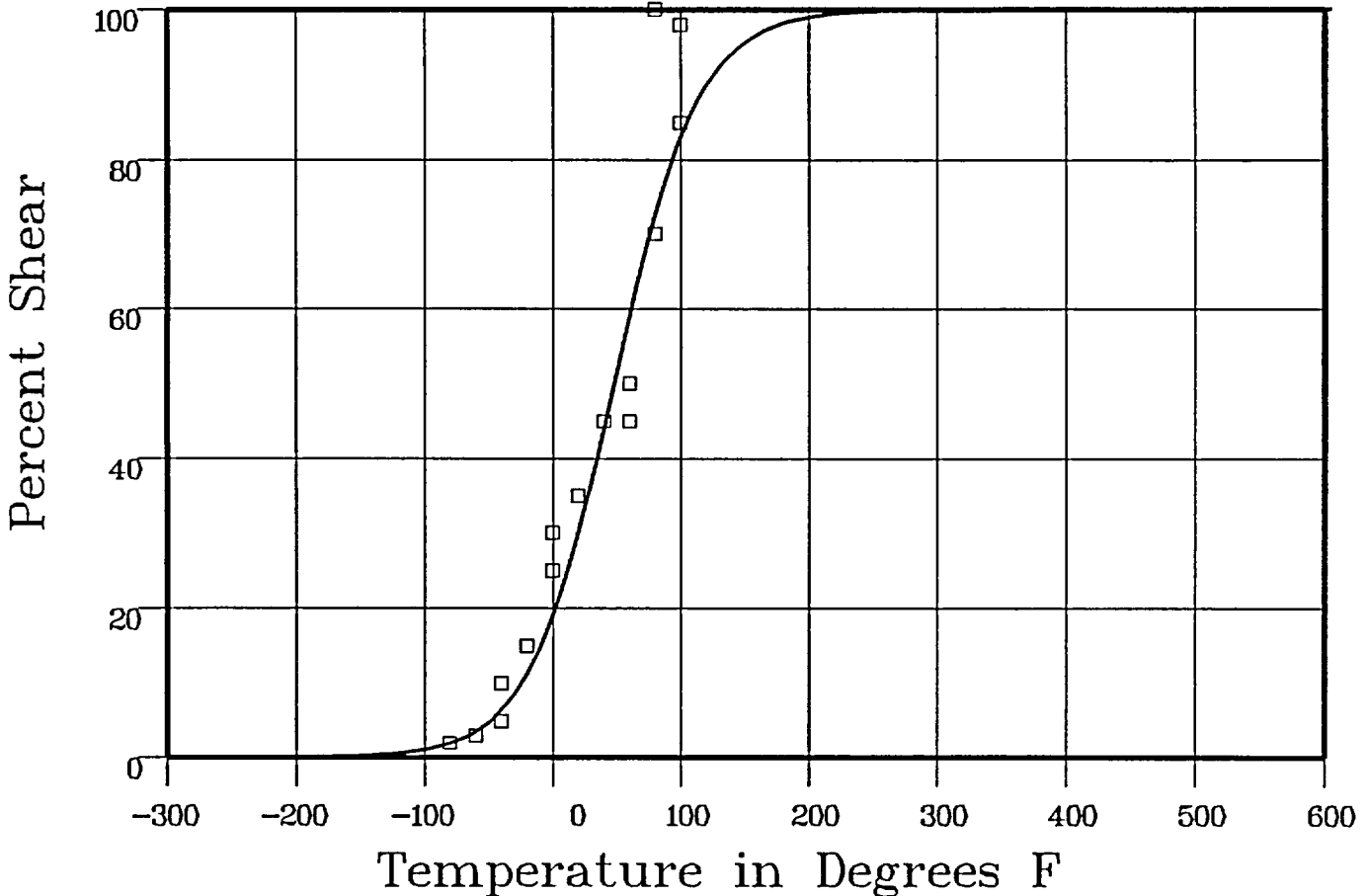
A = 50	B = 50	C = 65.93	T0 = 43.12
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 43.1

Material: SRM SA302B      Heat Number:      Orientation:

Capsule: UNIRR      Total Fluence:



Data Set(s) Plotted

Plant: TP3    Cap: UNIRR    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
-80	2	2.33	-0.33
-80	2	2.33	-0.33
-60	3	4.19	-1.19
-60	3	4.19	-1.19
-40	5	7.43	-2.43
-40	5	7.43	-2.43
-40	10	7.43	2.56
-20	15	12.84	2.15
-20	15	12.84	2.15

\*\*\*\* Data continued on next page \*\*\*\*

# STANDARD REFERENCE MATERIAL UNIRRADIATED

Page 2

Material: SRM SA302B

Heat Number:

Orientation:

Capsule: UNIRR

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
0	25	21.27	3.72
0	30	21.27	8.72
20	35	33.14	1.85
20	35	33.14	1.85
40	45	47.63	-2.63
40	45	47.63	-2.63
60	50	62.52	-12.52
60	45	62.52	-17.52
80	70	75.37	-5.37
80	100	75.37	24.62
100	85	84.88	.11
100	98	84.88	13.11
SUM of RESIDUALS =			12.27

# STANDARD REFERENCE MATERIAL CAPSULE S

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:49:13 on 06-18-2002

Page 1

Coefficients of Curve 2

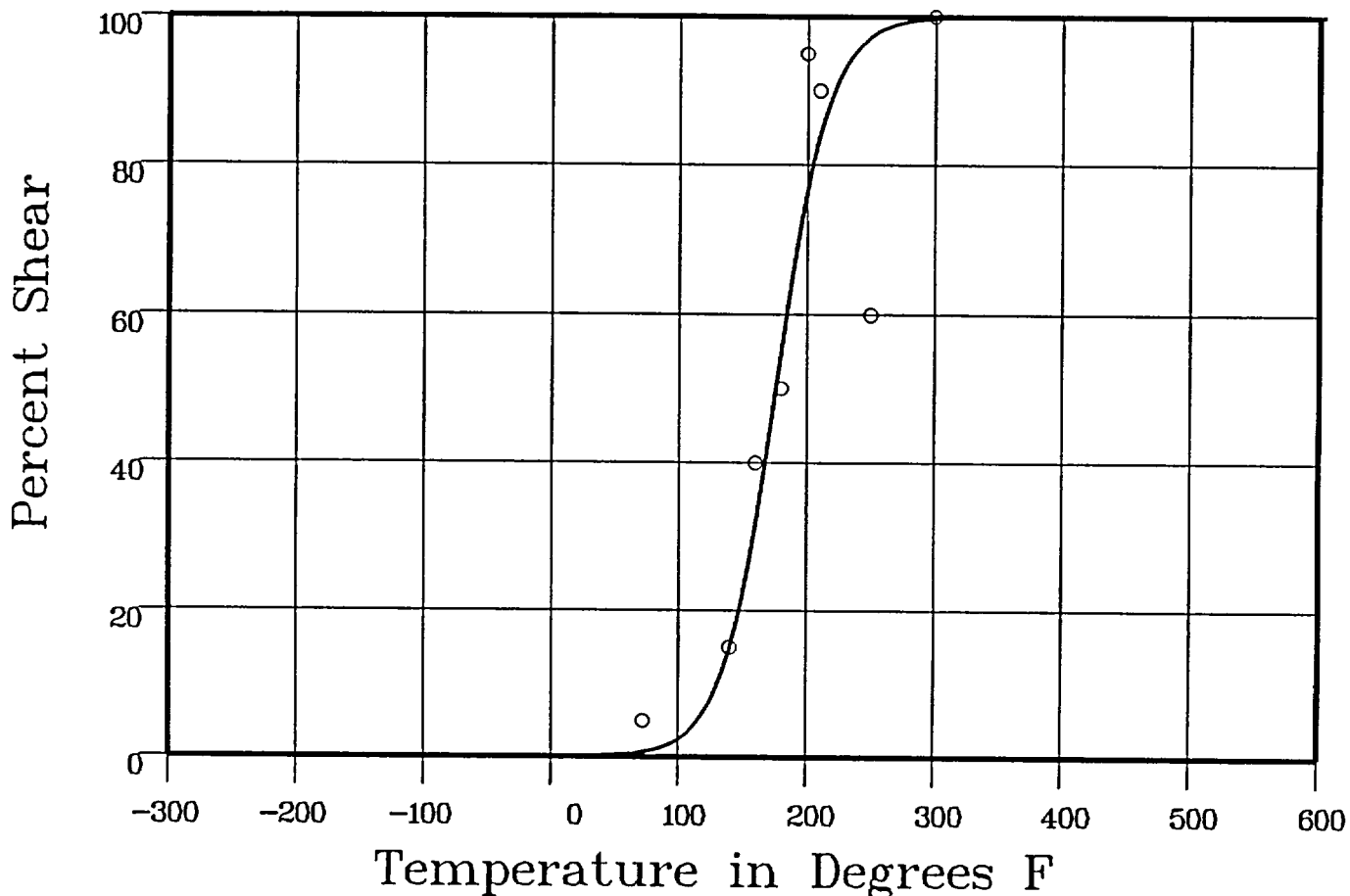
A = 50	B = 50	C = 4116	T0 = 171.38
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 171.3

Material: SRM SA302B      Heat Number:      Orientation:

Capsule: S      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: S    Material: SRM SA302B    Ori:    Heat #:

## Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
72	5	.79	4.2
140	15	17.87	-2.87
160	40	36.51	3.48
180	50	60.31	-10.31
200	95	80.06	14.93
210	90	86.71	3.28
250	60	97.85	-37.85
300	100	99.8	.19

SUM of RESIDUALS = -24.92

# STANDARD REFERENCE MATERIAL CAPSULE T

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:49:13 on 06-18-2002

Page 1

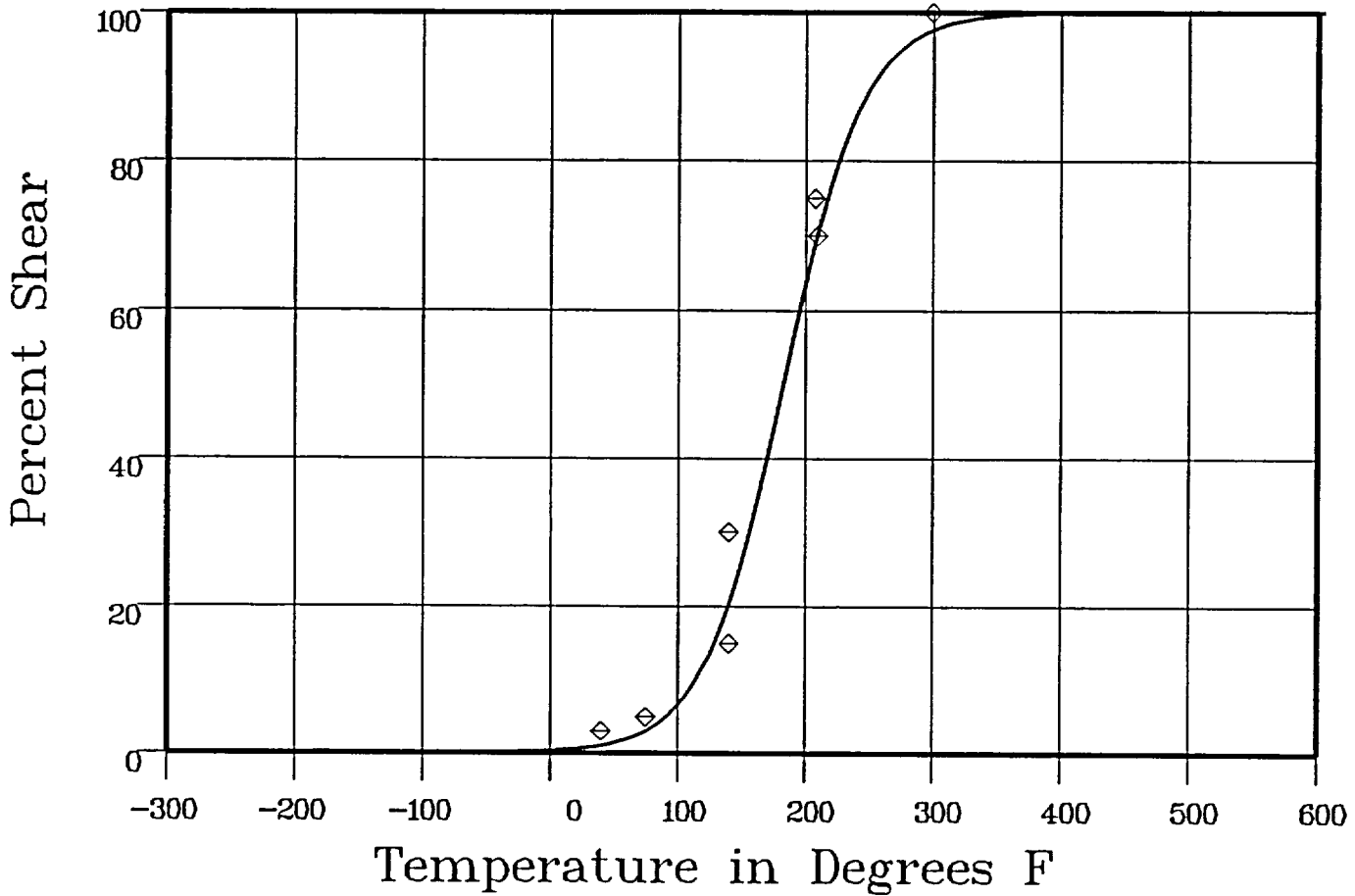
Coefficients of Curve 3

A = 50	B = 50	C = 62.69	T0 = 178.12
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 178.1

Material: SRM SA302B      Heat Number:      Orientation:  
 Capsule: T      Total Fluence:



Data Set(s) Plotted  
 Plant: TP3    Cap: T    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
40	3	12	179
75	5	35.9	14
140	15	22.86	-7.86
140	30	22.86	7.13
208	75	72.17	2.82
210	70	73.43	-3.43
300	100	97.99	2
300	100	97.99	2

SUM of RESIDUALS = 5.88

# STANDARD REFERENCE MATERIAL. CAPSULE V

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:49:13 on 06-18-2002

Page 1

Coefficients of Curve 4

A = 50	B = 50	C = 34.61	T0 = 163.47
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 163.4

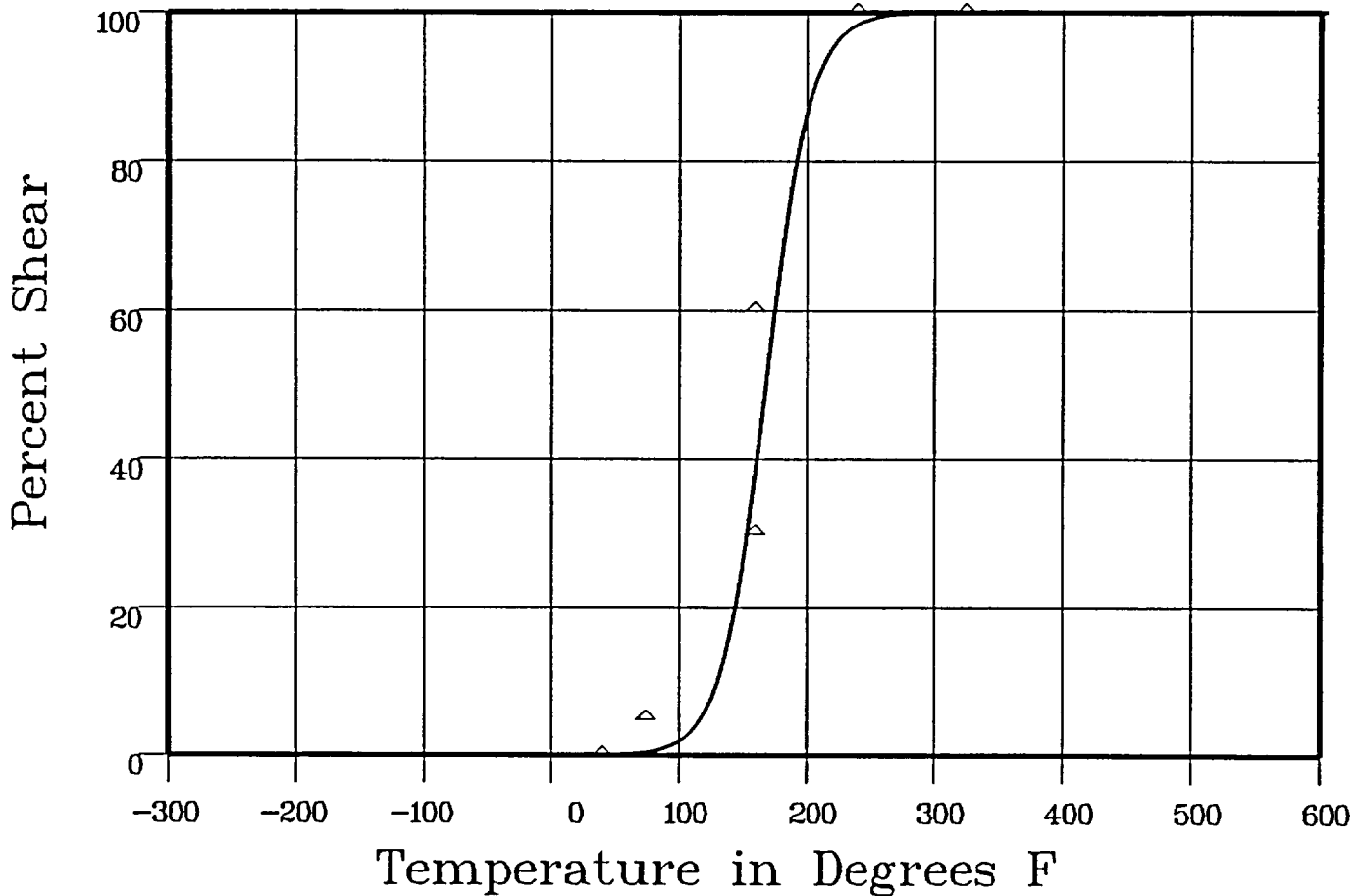
Material: SRM SA302B

Heat Number:

Orientation:

Capsule: V

Total Fluence:



Plant: TP3    Cap: V    Data Set(s) Plotted    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
40	0	.07	-.07
74	5	.56	4.43
160	30	44.99	-14.99
160	60	44.99	15
240	100	98.81	1.18
240	100	98.81	1.18
325	100	99.99	0

\*\*\*\* Data continued on next page \*\*\*\*

# STANDARD REFERENCE MATERIAL CAPSULE V

Page 2

Material: SRM SA302B

Heat Number:

Orientation:

Capsule: V

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature  
325

Input Percent Shear  
100

Computed Percent Shear  
99.99

Differential  
0

SUM of RESIDUALS = 6.75

# STANDARD REFERENCE MATERIAL CAPSULE X

CVGRAPH 4.1 Hyperbolic Tangent Curve Printed at 10:49:13 on 06-18-2002

Page 1

Coefficients of Curve 5

A = 50	B = 50	C = 69.45	T0 = 170.5
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Equation is:  $\text{Shear}\% = A + B * [ \tanh((T - T_0)/C) ]$

Temperature at 50% Shear: 170.5

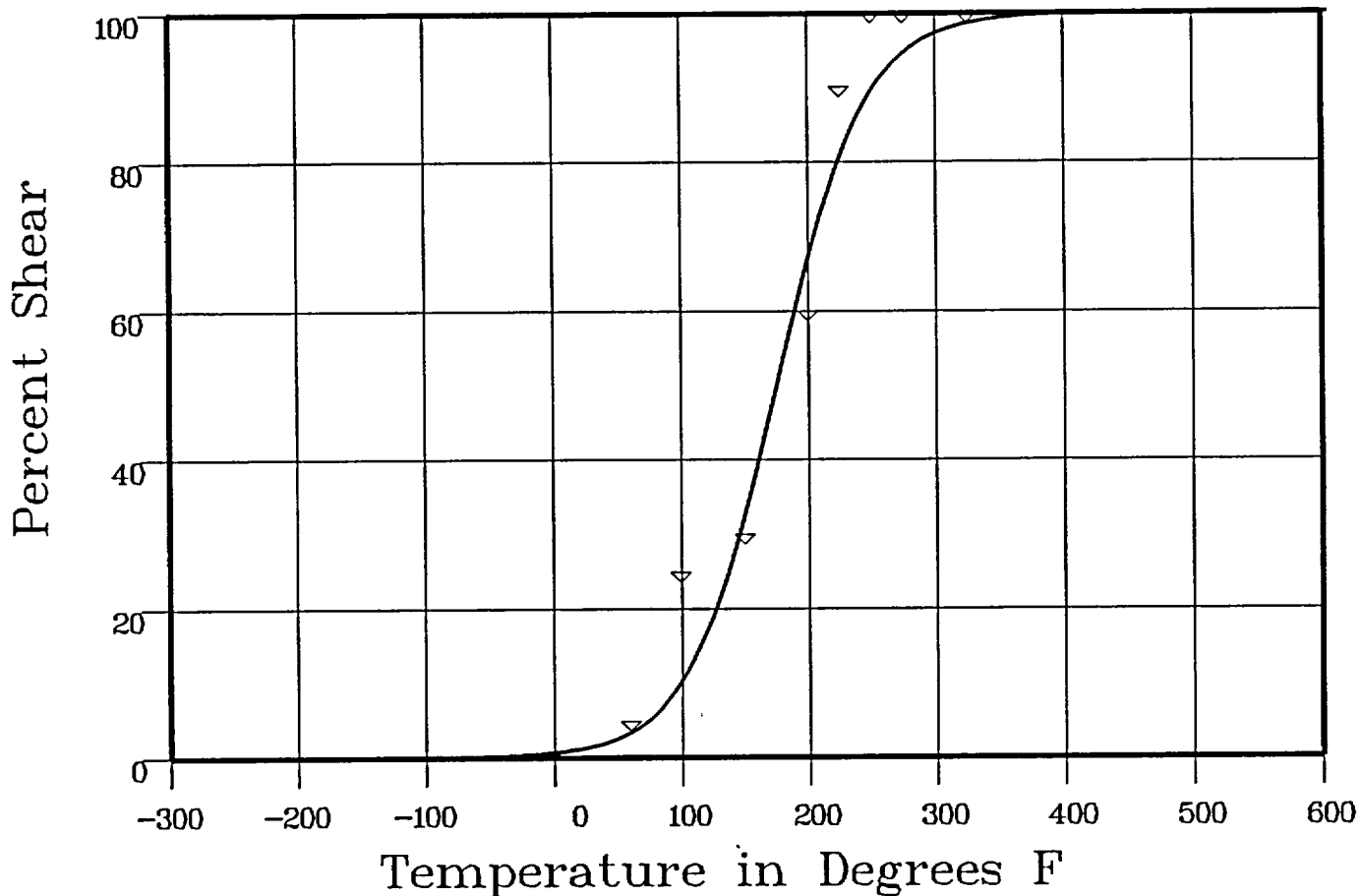
Material: SRM SA302B

Heat Number:

Orientation:

Capsule: X

Total Fluence:



Plant: TP3    Cap: X    Data Set(s) Plotted    Material: SRM SA302B    Ori:    Heat #:

### Charpy V-Notch Data

Temperature	Input Percent Shear	Computed Percent Shear	Differential
60	5	3.98	1.01
100	25	11.6	13.39
150	30	35.65	-5.65
200	60	70.04	-10.04
225	90	82.76	7.23
250	100	90.79	9.2

\*\*\*\* Data continued on next page \*\*\*\*

# STANDARD REFERENCE MATERIAL CAPSULE X

Page 2

Material: SRM SA302B

Heat Number:

Orientation:

Capsule: X

Total Fluence:

## Charpy V-Notch Data (Continued)

Temperature	Input Percent Shear	Computed Percent Shear	Differential
275	100	95.29	4.7
325	100	98.84	1.15

SUM of RESIDUALS = 21.01