Appendix II

Laser Damage Threshold Study Data

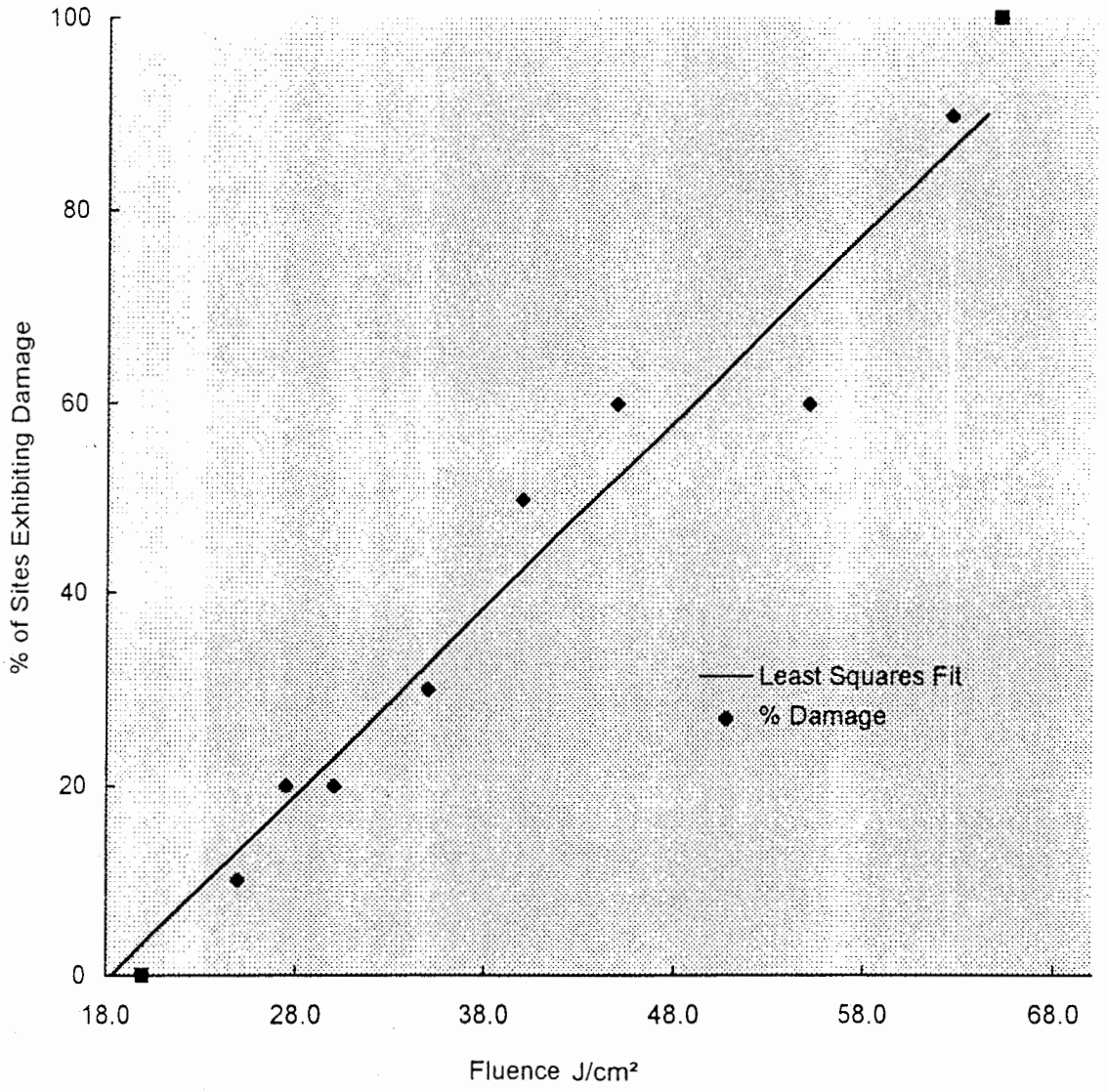
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-9 a			Fluence Range	18	70
Part No.	L-9					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
20	0	10	20	0	# of data points	10	2.0	slope	
25	1	10	25	10	# at 0%	1	-35.9	intercept	
27.5	2	10	27.5	20	# at 100%	1	0.9421	R^2	
30	2	10	30	20	# used in Linear Fit		18.32	J/cm²	Threshold
35	3	10	35	30	Calculation	8	Line Fit Coordinates		
40	5	10	40	50	Total Number		18.3207	0.0	
45	6	10	45	60	of Sites	100	64.35	90.2	
55	6	10	55	60					
62.5	9	10	62.5	90					
65	10	10	65	100					

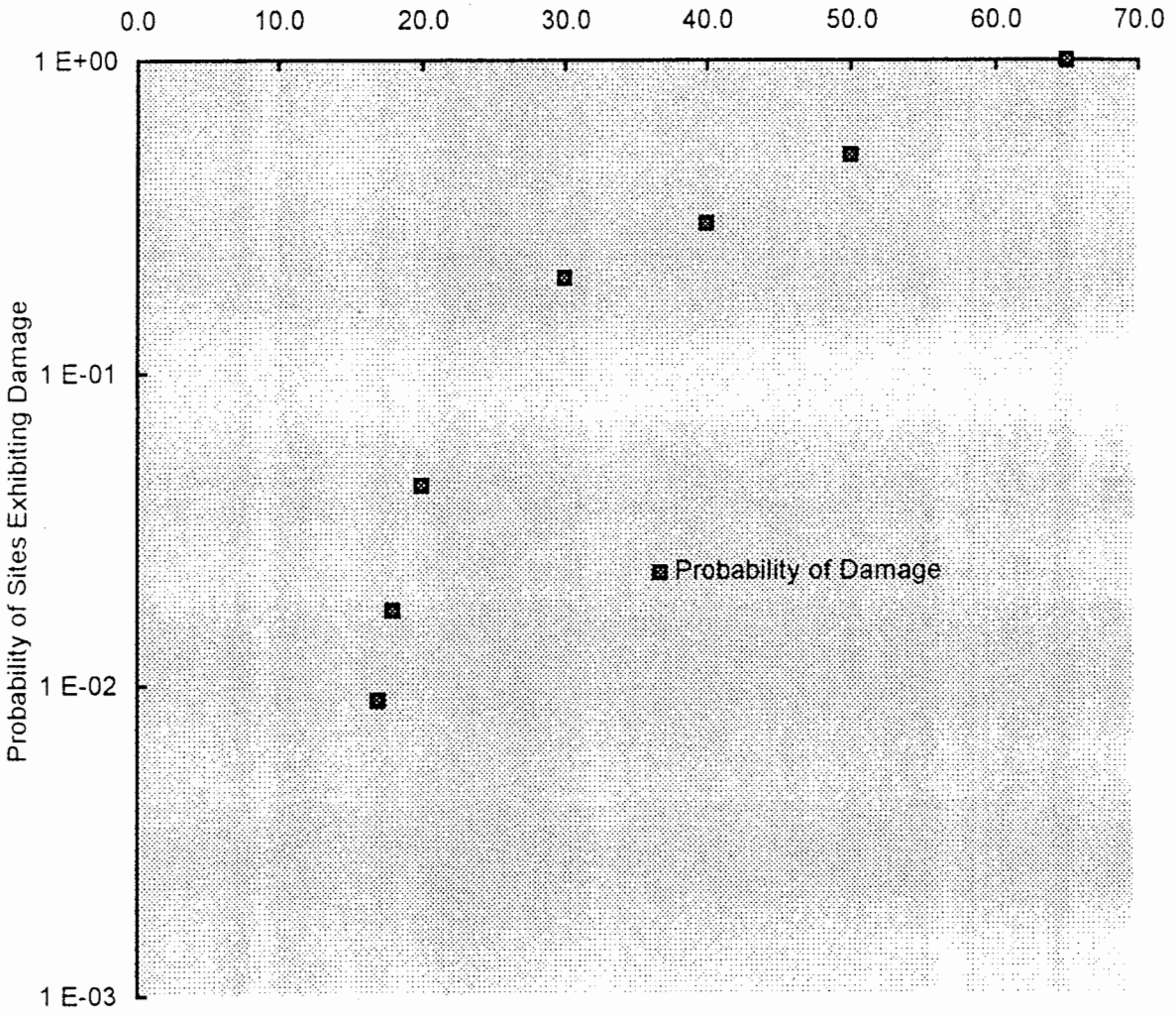
Laser Damage Frequency vs. Fluence

7008-DT L-9 a



"0" Probability of damage: 18.32 J/cm²
Pusewidth: 4 ns
Part # : L-9
R^2 = 0.9421

Laser Damage Frequency vs. Fluence



"0" Probability of damage: 17.05 J/cm²
Pusewidth: 4 ns
Part # : L-9
R^2 = 0.9891

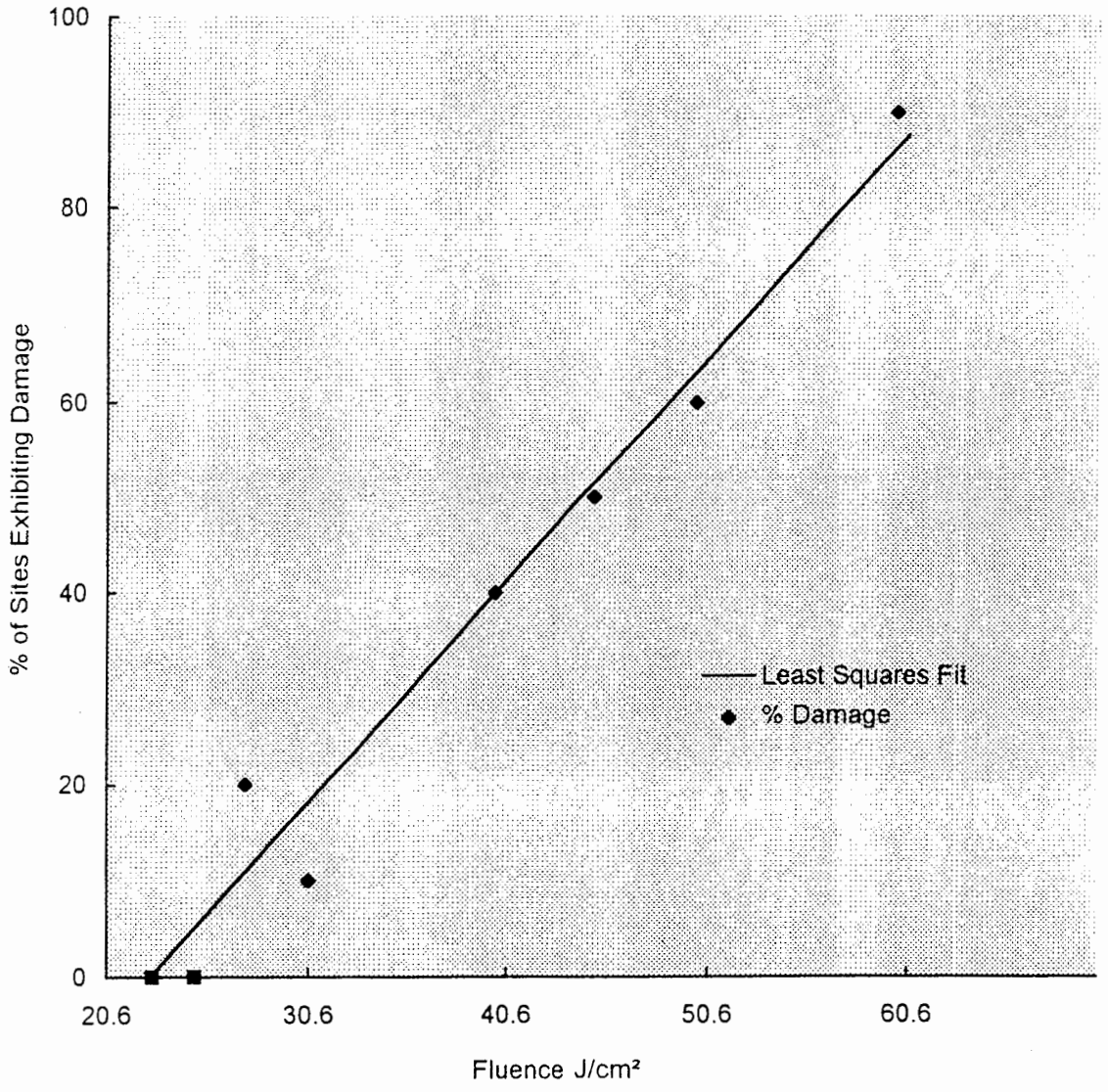
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-10 a			Fluence Range	20.6	70
Part No.	L-10					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
22.9	0	10	22.9	0	# of data points	8	2.3	slope	
25	0	10	25	0	# at 0%	2	-52.7	intercept	
27.5	2	10	27.5	20	# at 100%	0	0.9581	R^2	
30.6	1	10	30.6	10	# used in Linear Fit		22.76	J/cm²	Threshold
40	4	10	40	40	Calculation	6	Line Fit Coordinates		
45	5	10	45	50	Total Number		22.757	0.0	
50	6	10	50	60	of Sites	80	60.6	87.7	
60	9	10	60	90					

Laser Damage Frequency vs. Fluence

7008-DT L-10 a



"0" Probability of damage: 22.76 J/cm²

Pusewidth: 4 ns

Part # : L-10

R^2 = 0.9581

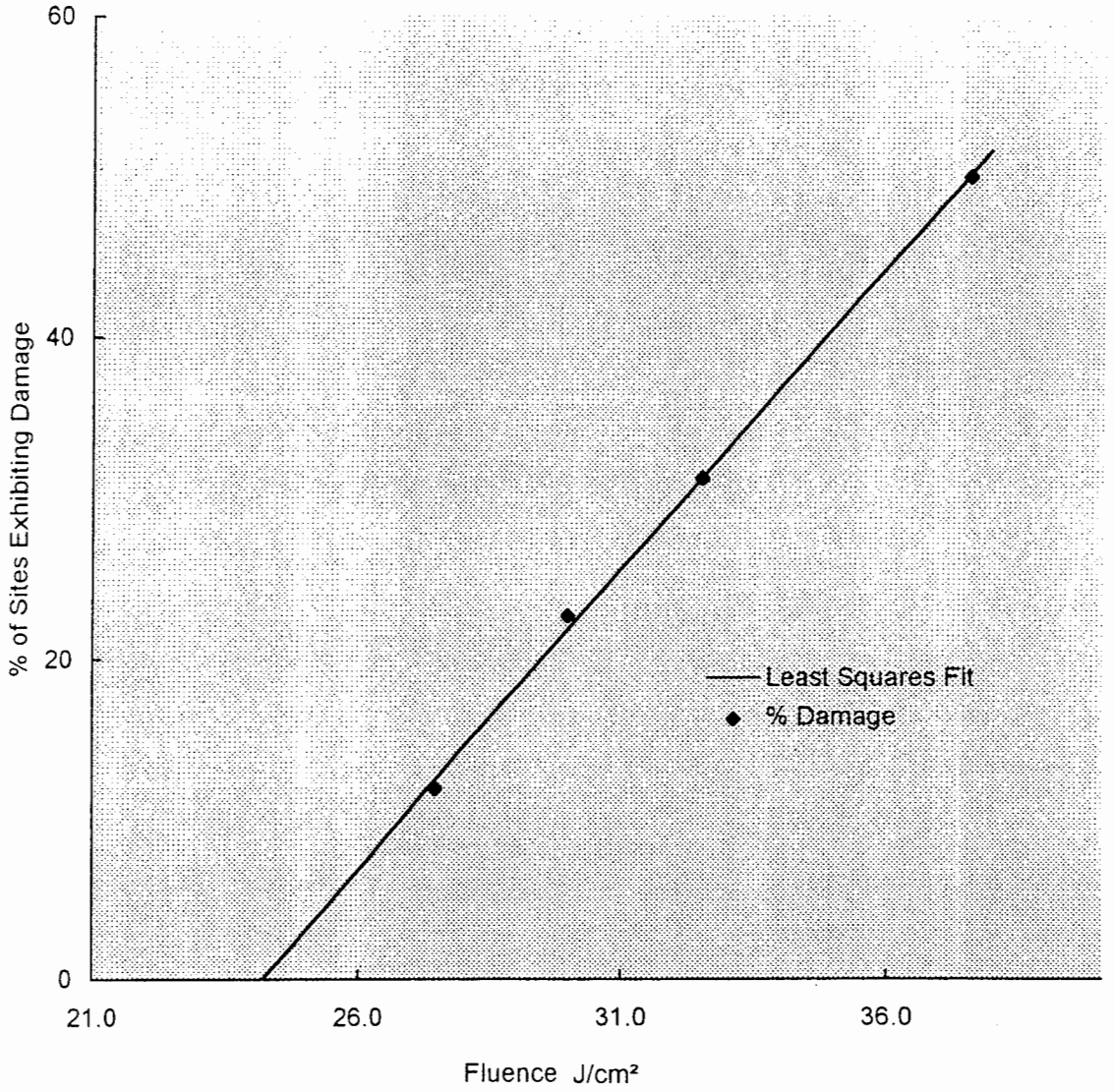
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-10 b			Fluence Range	21	40
Part No.	L-10					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	60

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
27.5	5	42	27.5	11.905	# of data points	4	3.8	slope	
30	5	22	30	22.727	# at 0%	0	-91.1	intercept	
32.5	5	16	32.5	31.25	# at 100%	0	0.9987	R^2	
37.5	5	10	37.5	50	# used in Linear Fit		24.19	J/cm²	Threshold
		---			Calculation	4	Line Fit Coordinates		
		---			Total Number		24.1872	0.0	
		---			of Sites	90	37.875	51.6	

Laser Damage Frequency vs. Fluence

7008-DT L-10 b



"0" Probability of damage: 24.19 J/cm²

Pusewidth: 4 ns

Part # : L-10

R^2 = 0.9987

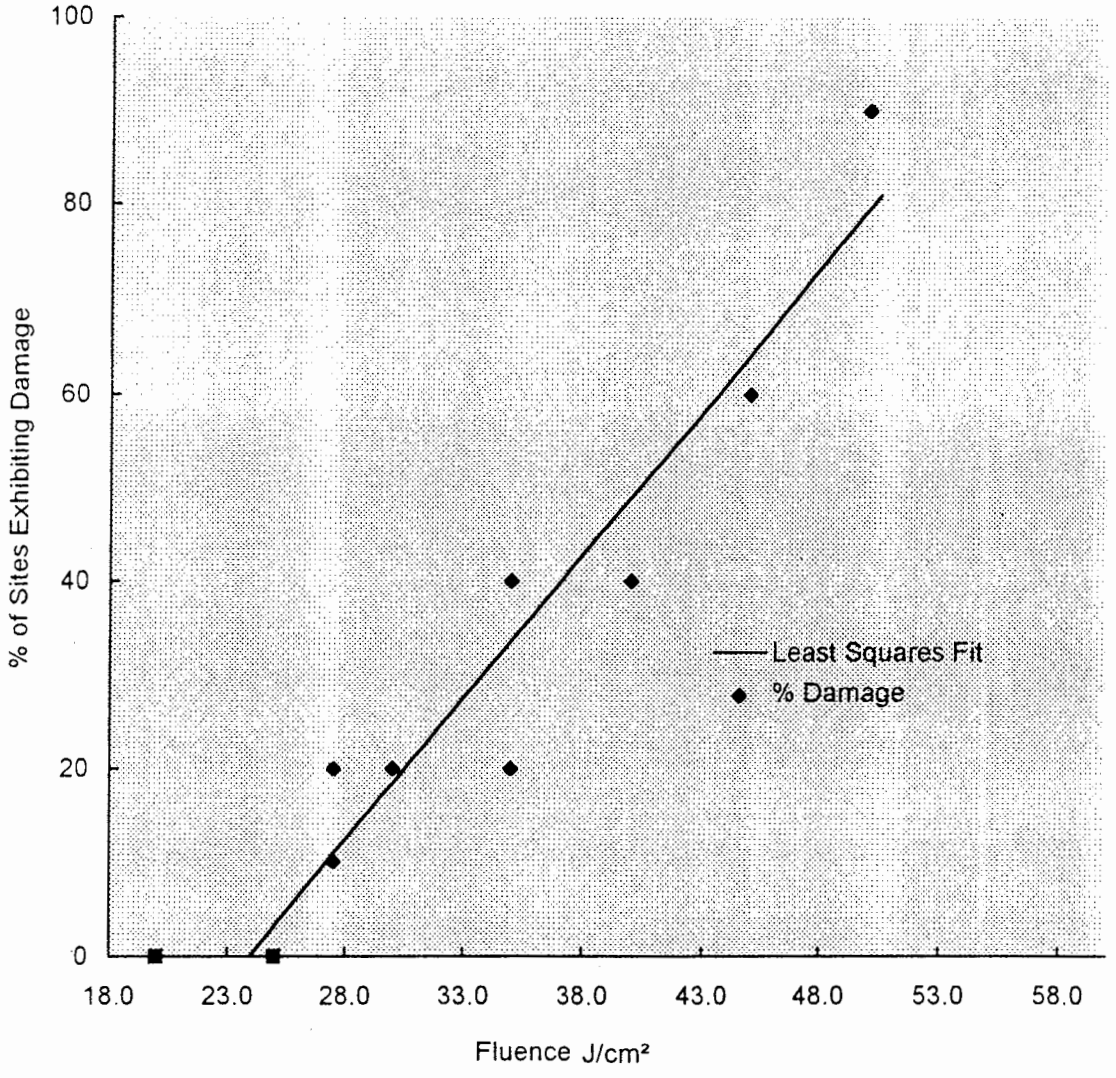
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-11 a			Fluence Range	18	60
Part No.	L-11					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data	
Fluence	# Dam	Out Of	Fluenc	% Dam				
20	0	10	20	0	# of data points	10	3.1	slope
25	0	10	25	0	# at 0%	2	-73.2	intercept
27.5	2	10	27.5	20	# at 100%	0	0.8942	R^2
27.5	1	10	27.5	10	# used in Linear Fit		23.97	J/cm² Threshold
30	2	10	30	20	Calculation	8	Line Fit Coordinates	
35	2	10	35	20	Total Number		23.9655	0.0
35	4	10	35	40	of Sites	100	50.5	81.0
40	4	10	40	40				
45	6	10	45	60				
50	9	10	50	90				

Laser Damage Frequency vs. Fluence

7008-DT L-11 a



"0" Probability of damage: 23.97 J/cm²
Pusewidth: 4 ns
Part # : L-11
R^2 = 0.8942

Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-11 b			Fluence Range	20	40
Part No.	L-11					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	40

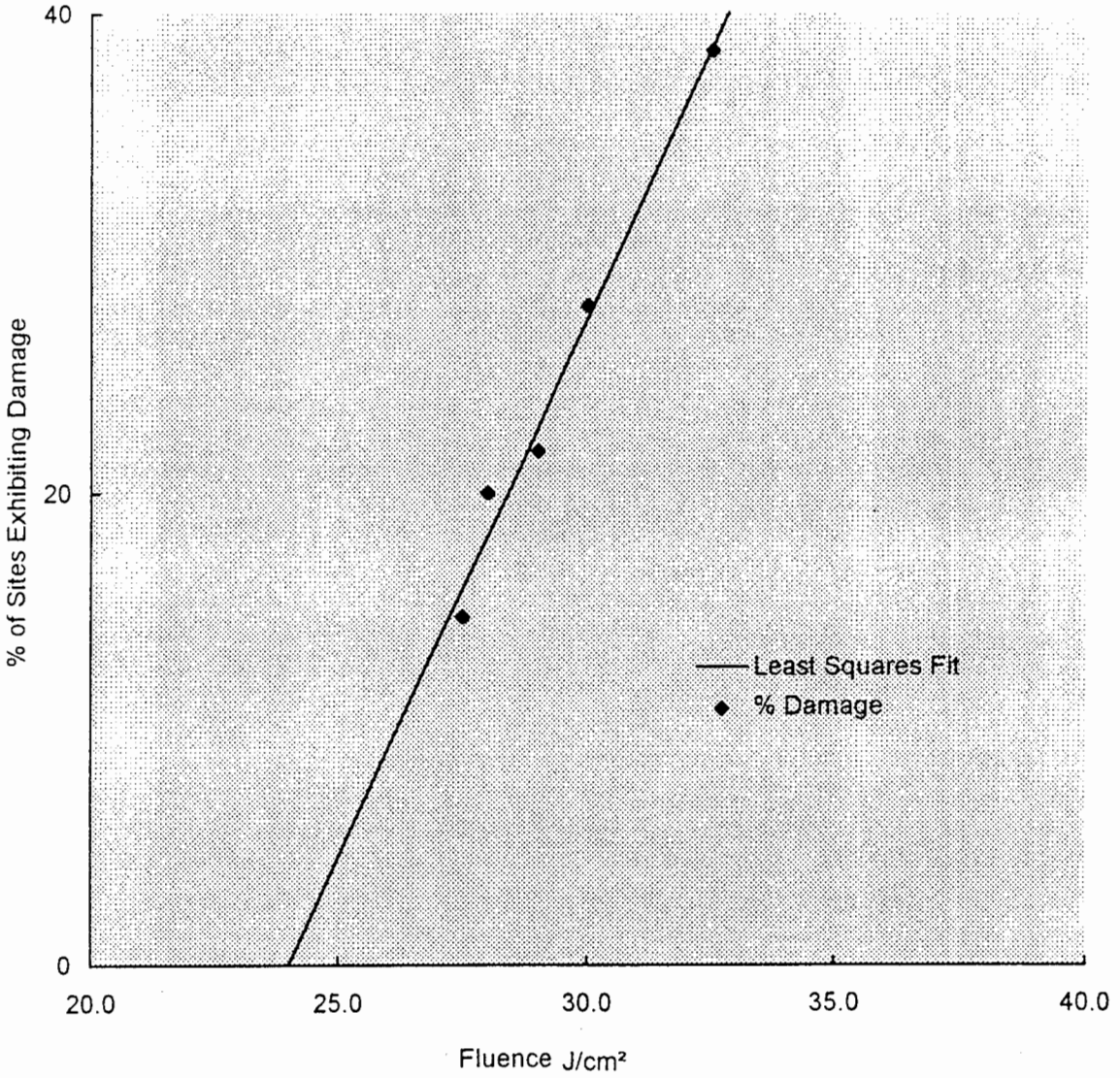
Raw Data Entry			Line Data		Summary of Raw Data		Fit Data	
Fluence	# Dam	Out Of	Fluenc	% Dam				
27.5	5	34	27.5	14.706	# of data points	5	4.5	slope
28	5	25	28	20	# at 0%	0	-108.9	intercept
29	5	23	29	21.739	# at 100%	0	0.9817	R^2
30	5	18	30	27.778	# used in Linear Fit		23.99	J/cm² Threshold
32.5	5	13	32.5	38.462	Calculation	5	Line Fit Coordinates	
		---			Total Number		23.9941	0.0
		---			of Sites	113	32.825	40.1

		---						

x

Laser Damage Frequency vs. Fluence

7008-DT L-11 b



"0" Probability of damage: 23.99 J/cm²
Pusewidth: 4 ns
Part # : L-11
R^2 = 0.9817

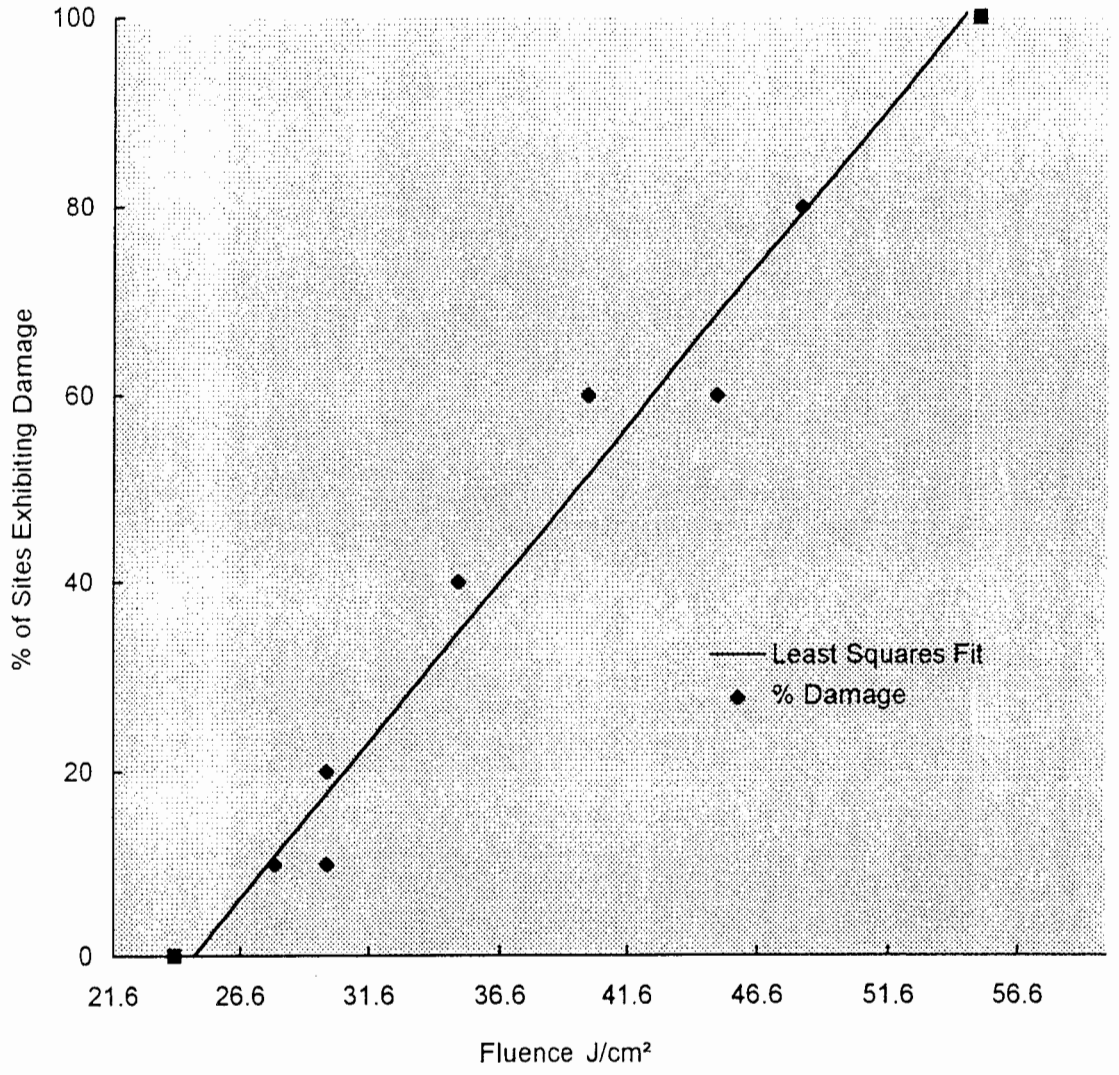
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-12 a			Fluence Range	21.6	60
Part No.	L-12					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
24	0	10	24	0	# of data points	9	3.4	slope	
28	1	10	28	10	# at 0%	1	-83.9	intercept	
30	1	10	30	10	# at 100%	1	0.9483	R^2	
30	2	10	30	20	# used in Linear Fit		24.78	J/cm²	Threshold
35	4	10	35	40	Calculation	7	Line Fit Coordinates		
40	6	10	40	60	Total Number		24.7846	0.0	
45	6	10	45	60	of Sites	90	54.45	100.4	
48.22	8	10	48.22	80					
55	10	10	55	100					

Laser Damage Frequency vs. Fluence

7008-DT L-12 a



"0" Probability of damage: 24.78 J/cm²

Pusewidth: 4 ns

Part # : L-12

R^2 = 0.9483

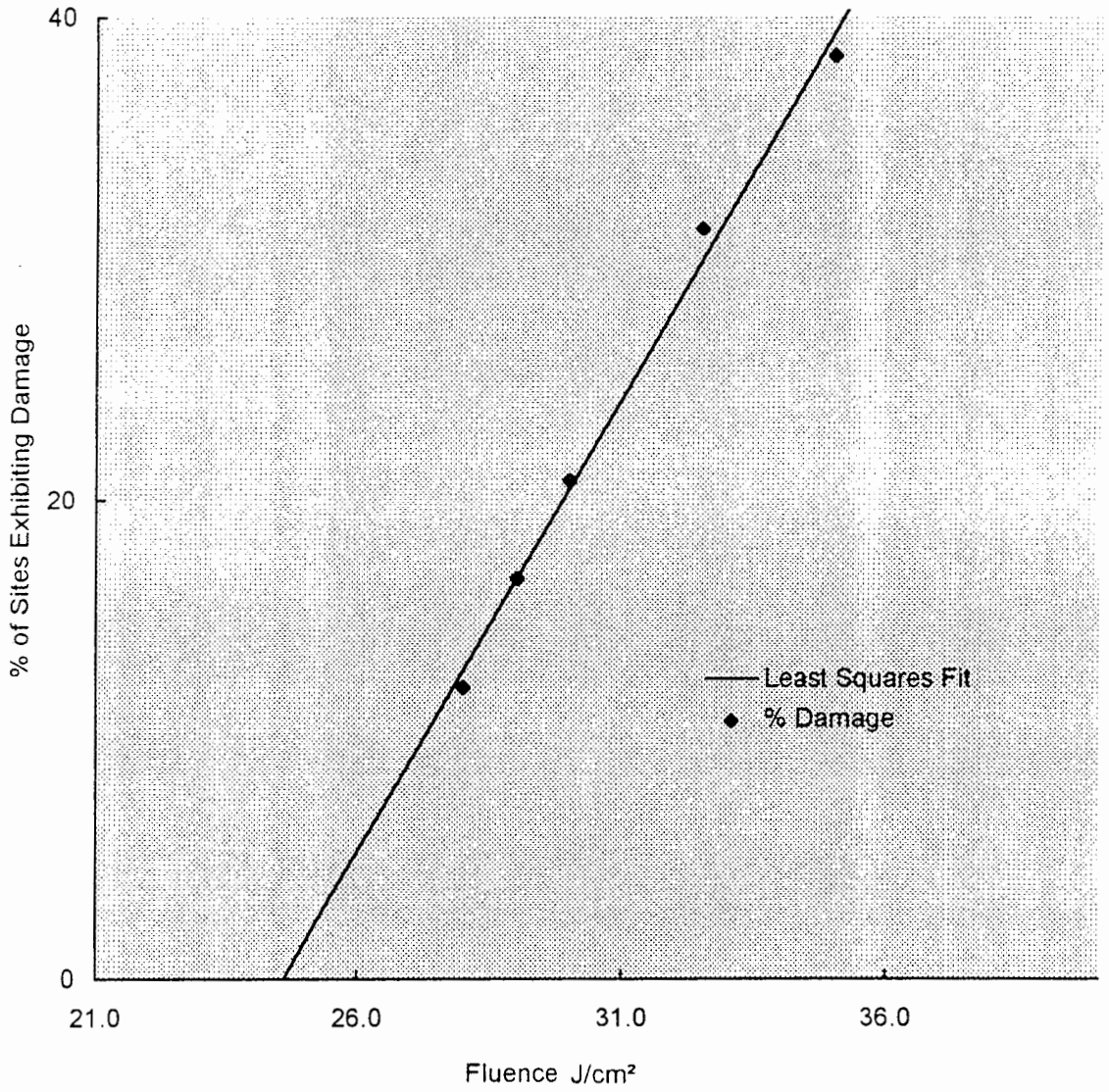
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-12 b			Fluence Range	21	40
Part No.	L-12					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	40

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data	
Fluence	# Dam	Out Of	Fluenc	% Dam				
28	5	41	28	12.195	# of data points	5	3.8	slope
29	5	30	29	16.667	# at 0%	0	-93.1	intercept
30	5	24	30	20.833	# at 100%	0	0.9930	R^2
32.5	5	16	32.5	31.25	# used in Linear Fit		24.59	J/cm² Threshold
35	5	13	35	38.462	Calculation	5	Line Fit Coordinates	
		---			Total Number		24.5922	0.0
		---			of Sites	124	35.35	40.7

Laser Damage Frequency vs. Fluence

7008-DT L-12 b



"0" Probability of damage: 24.59 J/cm²

Pusewidth: 4 ns

Part # : L-12

R^2 = 0.9930

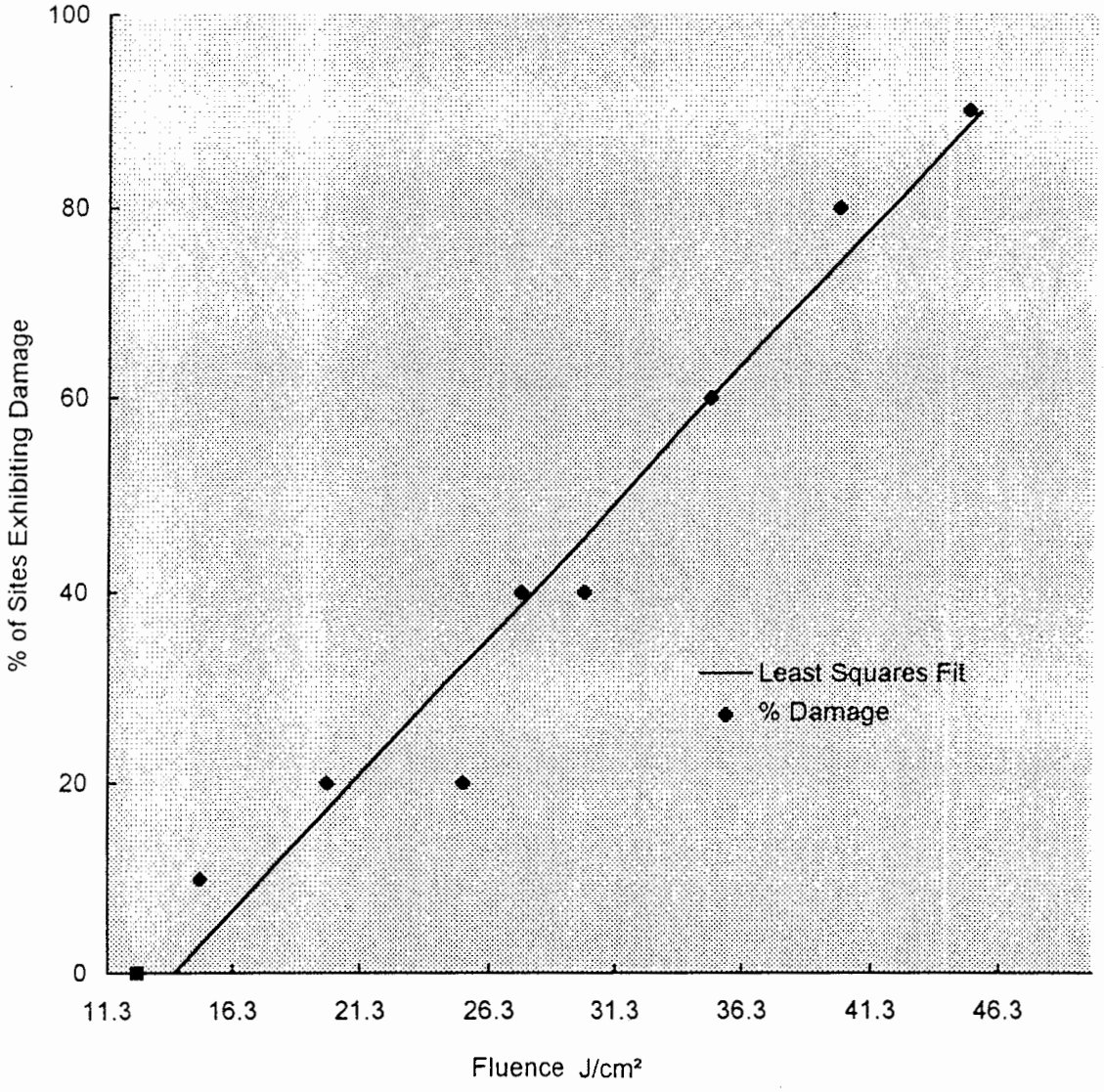
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-13 a			Fluence Range	11.3	50
Part No.	L-13					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
12.5	0	10	12.5	0	# of data points	9	2.9	slope	
15	1	10	15	10	# at 0%	1	-39.8	intercept	
20	2	10	20	20	# at 100%	0	0.9534	R^2	
25.3	2	10	25.3	20	# used in Linear Fit		13.95	J/cm²	Threshold
27.5	4	10	27.5	40	Calculation	8	Line Fit Coordinates		
30	4	10	30	40	Total Number		13.9529	0.0	
35	6	10	35	60	of Sites	90	45.45	89.9	
40	8	10	40	80					
45	9	10	45	90					

Laser Damage Frequency vs. Fluence

7008-DT L-13 a



"0" Probability of damage: 13.95 J/cm²

Pusewidth: 4 ns

Part # : L-13

R^2 = 0.9534

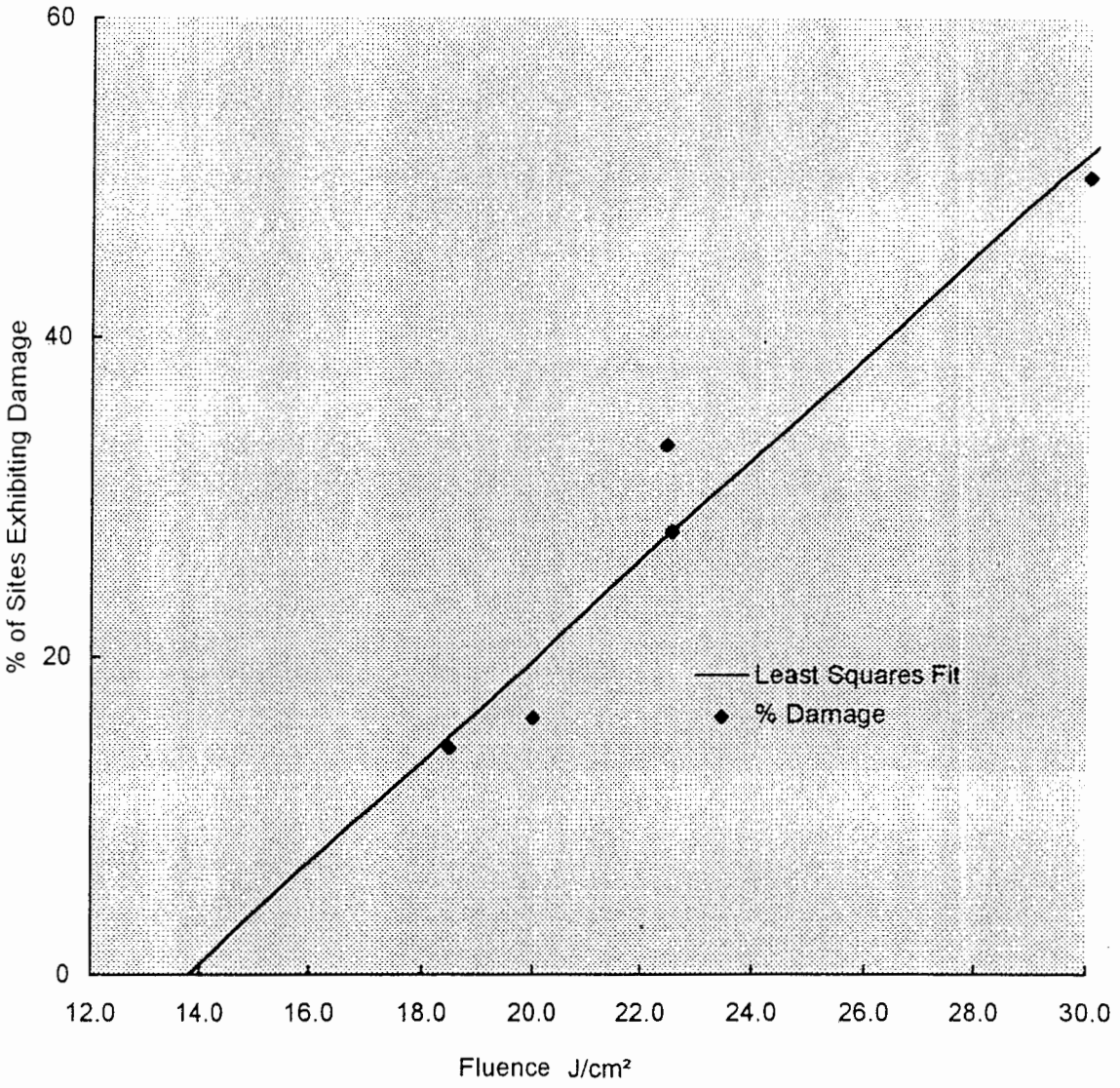
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-13 b			Fluence Range	12	30
Part No.	L-13					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	60

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
18.5	5	35	18.5	14.286	# of data points	5	3.2	slope	
20	5	31	20	16.129	# at 0%	0	-43.9	intercept	
22.45	5	15	22.45	33.333	# at 100%	0	0.9411	R^2	
22.55	5	18	22.55	27.778	# used in Linear Fit		13.80	J/cm²	Threshold
30	5	10	30	50	Calculation	5	Line Fit Coordinates		
		---			Total Number		13.7969	0.0	
		---			of Sites	109	30.3	52.5	

Laser Damage Frequency vs. Fluence

7008-DT L-13 b



"0" Probability of damage: 13.80 J/cm²
Pusewidth: 4 ns
Part # : L-13
R^2 = 0.9411

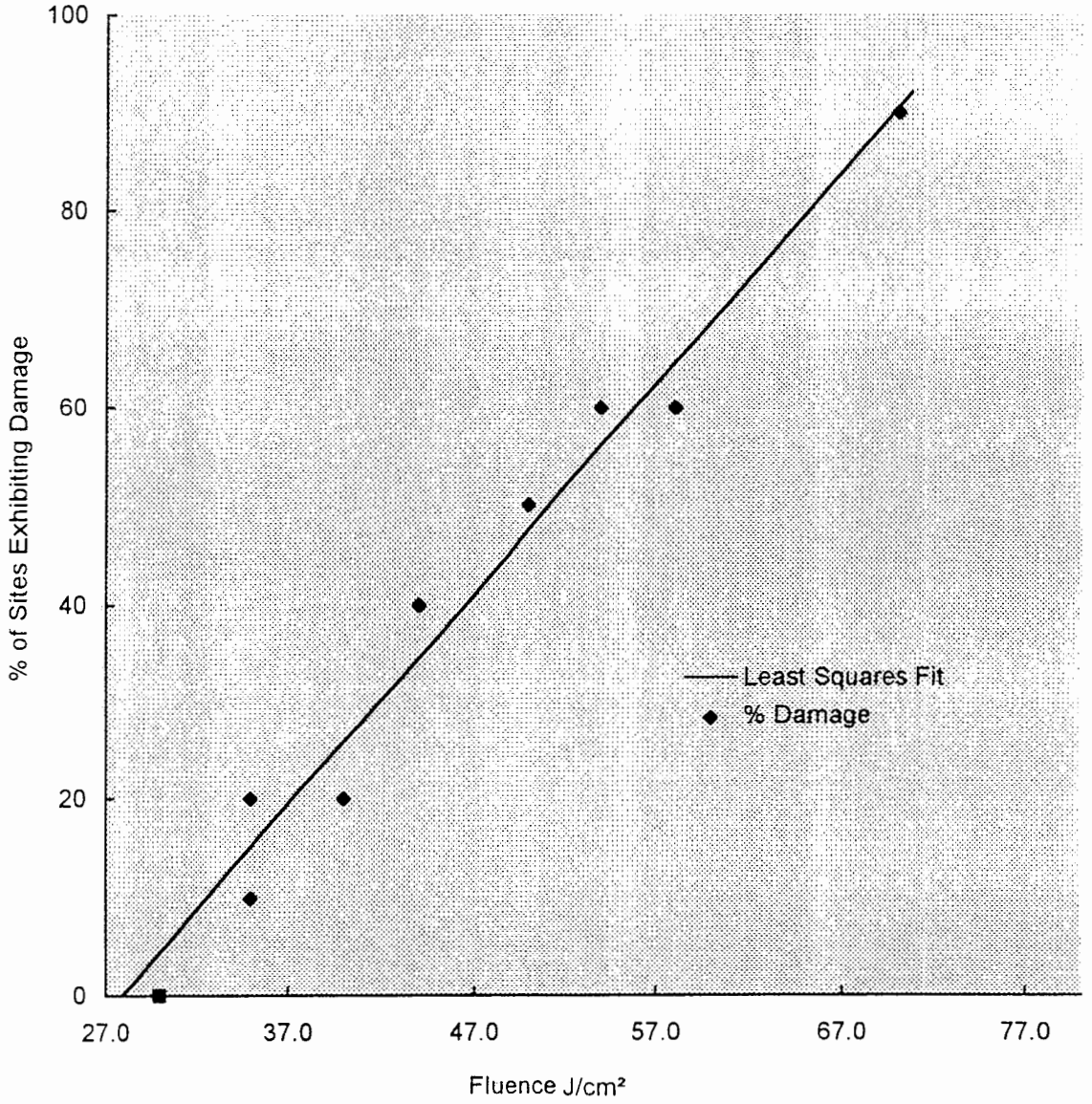
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-14 a			Fluence Range	27	80
Part No.	L-14					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
30	0	10	30	0	# of data points	9	2.2	slope	
35	1	10	35	10	# at 0%	1	-60.1	intercept	
35	2	10	35	20	# at 100%	0	0.9681	R^2	
40	2	10	40	20	# used in Linear Fit		27.93	J/cm²	Threshold
44	4	10	44	40	Calculation	8	Line Fit Coordinates		
50	5	10	50	50	Total Number		27.9309	0.0	
54	6	10	54	60	of Sites	90	70.7	92.1	
58	6	10	58	60					
70	9	10	70	90					

Laser Damage Frequency vs. Fluence

7008-DT L-14 a



"0" Probability of damage: 27.93 J/cm²

Pusewidth: 4 ns

Part # : L-14

R^2 = 0.9681

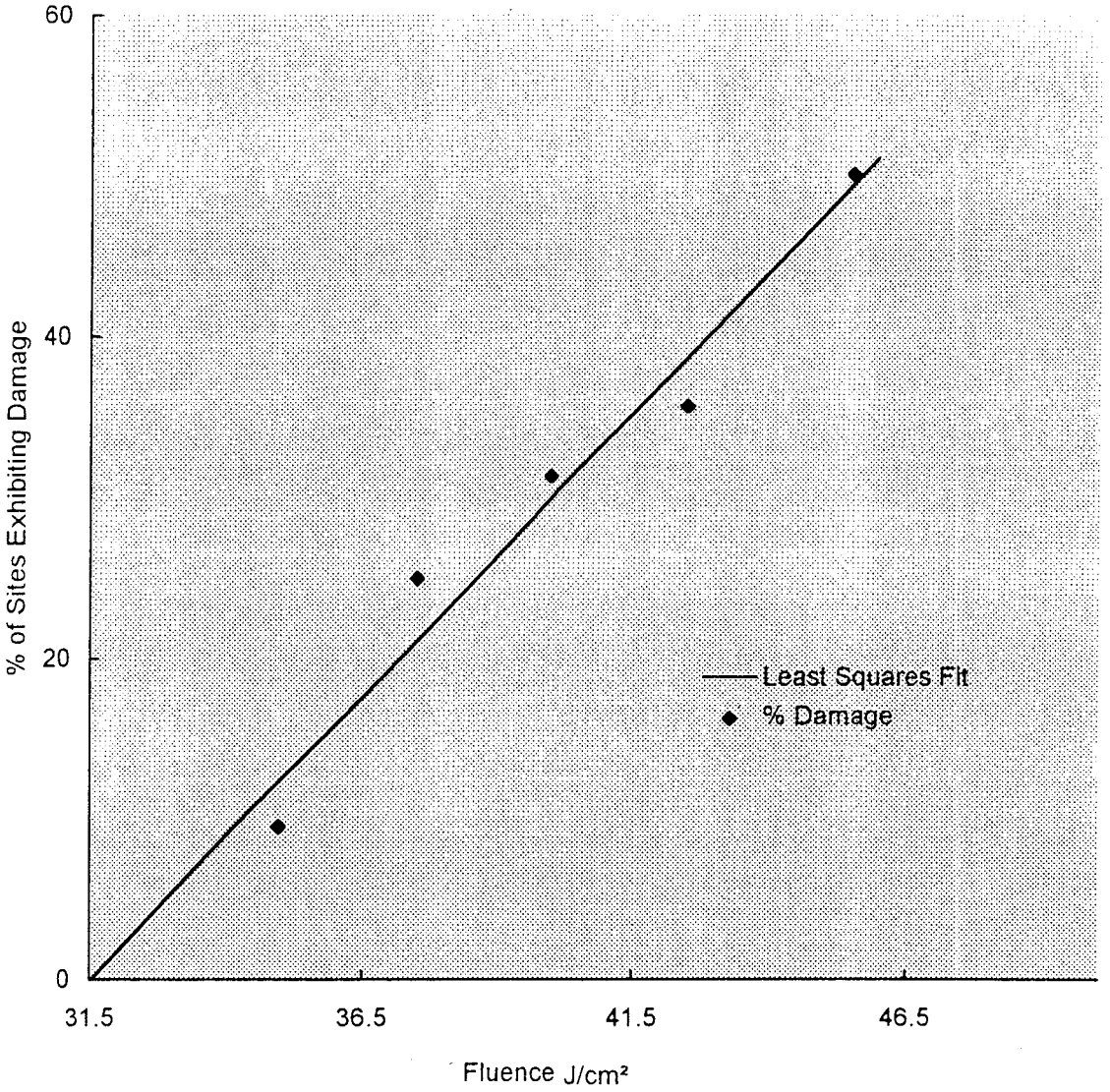
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-14 b			Fluence Range	31.5	50
Part No.	L-14					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	60

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data	
Fluence	# Dam	Out Of	Fluenc	% Dam				
35	5	53	35	9.434	# of data points	5	3.5	slope
37.5	5	20	37.5	25	# at 0%	0	-111.6	intercept
40	5	16	40	31.25	# at 100%	0	0.9607	R^2
42.5	5	14	42.5	35.714	# used in Linear Fit		31.54	J/cm² Threshold
45.5	5	10	45.5	50	Calculation	5	Line Fit Coordinates	
		---			Total Number		31.5399	0.0
		---			of Sites	113	45.955	51.0

Laser Damage Frequency vs. Fluence

7008-DT L-14 b



"0" Probability of damage: 31.54 J/cm²

Pusewidth: 4 ns

Part # : L-14

R^2 = 0.9607

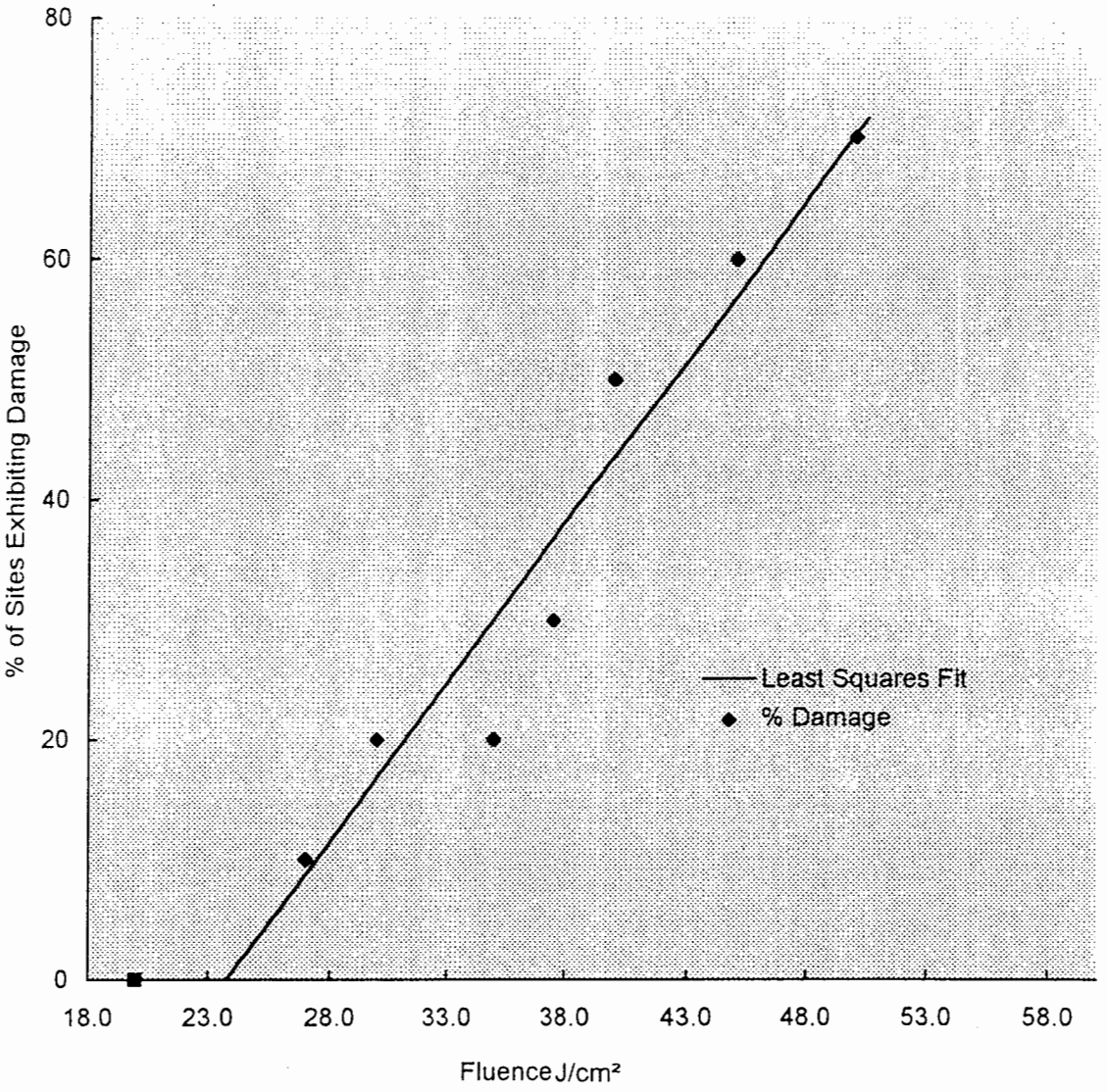
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-15 a			Fluence Range	18	60
Part No.	L-15					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	80

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
20	0	10	20	0	# of data points	9	2.7	slope	
27	1	10	27	10	# at 0%	1	-63.5	intercept	
30	2	10	30	20	# at 100%	0	0.9342	R^2	
30	2	10	30	20	# used in Linear Fit		23.73	J/cm²	Threshold
35	2	10	35	20	Calculation	8	Line Fit Coordinates		
37.5	3	10	37.5	30	Total Number		23.7271	0.0	
40	5	10	40	50	of Sites	90	50.5	71.6	
45	6	10	45	60					
50	7	10	50	70					

Laser Damage Frequency vs. Fluence

7008-DT L-15 a



"0" Probability of damage: 23.73 J/cm²
Pusewidth: 4 ns
Part # : L-15
R^2 = 0.9342

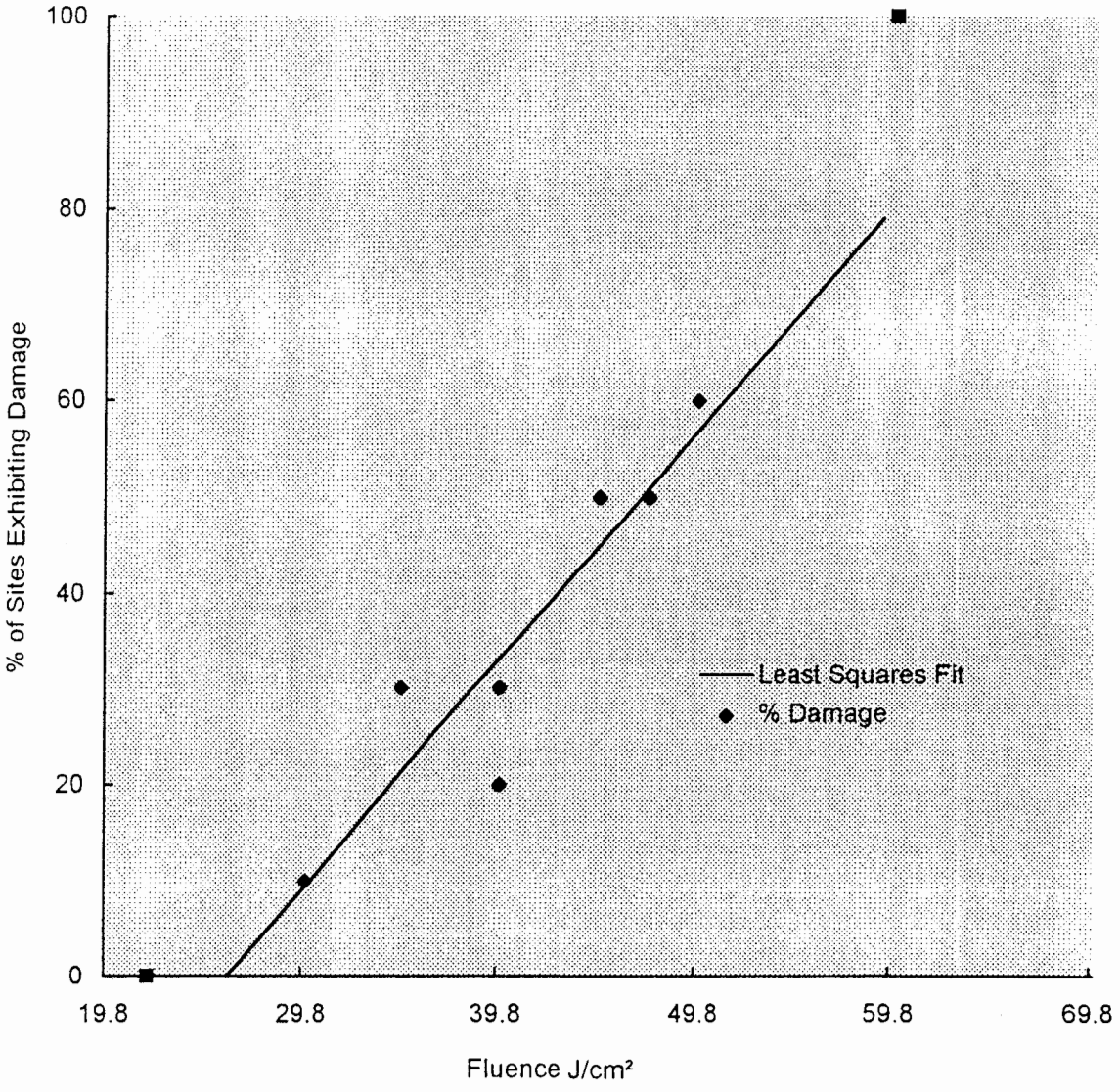
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-15 b			Fluence Range	19.8	70
Part No.	L-15					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
22	0	10	22	0	# of data points	9	2.4	slope	
30	1	10	30	10	# at 0%	1	-61.7	intercept	
35	3	10	35	30	# at 100%	1	0.8506	R^2	
40	2	10	40	20	# used in Linear Fit		26.01	J/cm²	Threshold
40	3	10	40	30	Calculation	7	Line Fit Coordinates		
45	5	10	45	50	Total Number		26.0101	0.0	
47.5	5	10	47.5	50	of Sites	90	59.4	79.2	
50	6	10	50	60					
60	10	10	60	100					

Laser Damage Frequency vs. Fluence

7008-DT L-15 b



"0" Probability of damage: 26.01 J/cm²
Pusewidth: 4 ns
Part # : L-15
R^2 = 0.8506

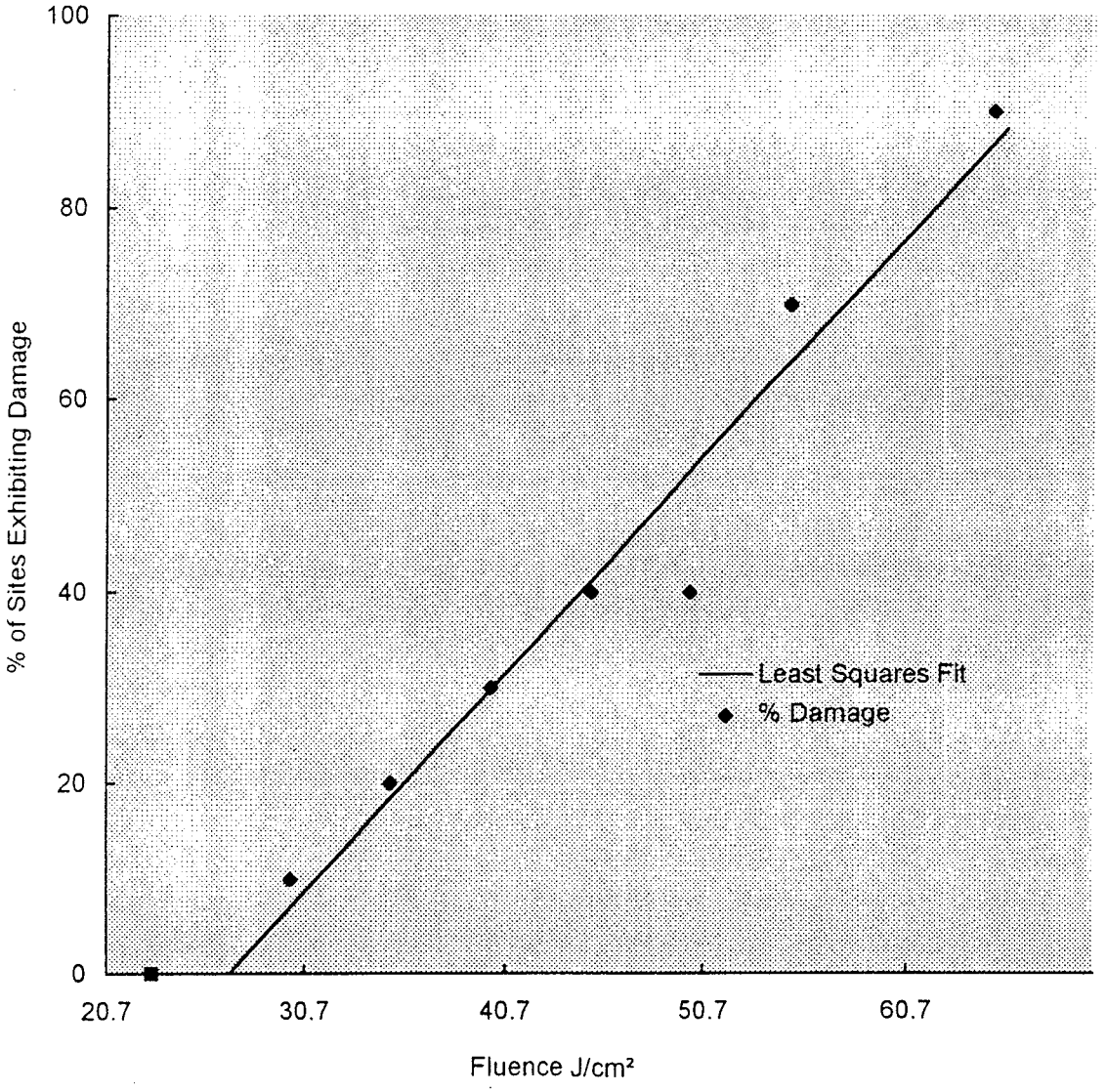
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-16 a			Fluence Range	20.7	70
Part No.	L-16					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data	
Fluence	# Dam	Out Of	Fluenc	% Dam				
23	0	10	23	0	# of data points	8	2.3	slope
30	1	10	30	10	# at 0%	1	-61.3	intercept
35	2	10	35	20	# at 100%	0	0.9540	R^2
40	3	10	40	30	# used in Linear Fit		26.91	J/cm² Threshold
45	4	10	45	40	Calculation	7	Line Fit Coordinates	
50	4	10	50	40	Total Number		26.9065	0.0
55	7	10	55	70	of Sites	80	65.65	88.3
65	9	10	65	90				

Laser Damage Frequency vs. Fluence

7008-DT L-16 a



"0" Probability of damage: 26.91 J/cm²
Pusewidth: 4 ns
Part # : L-16
R^2 = 0.9540

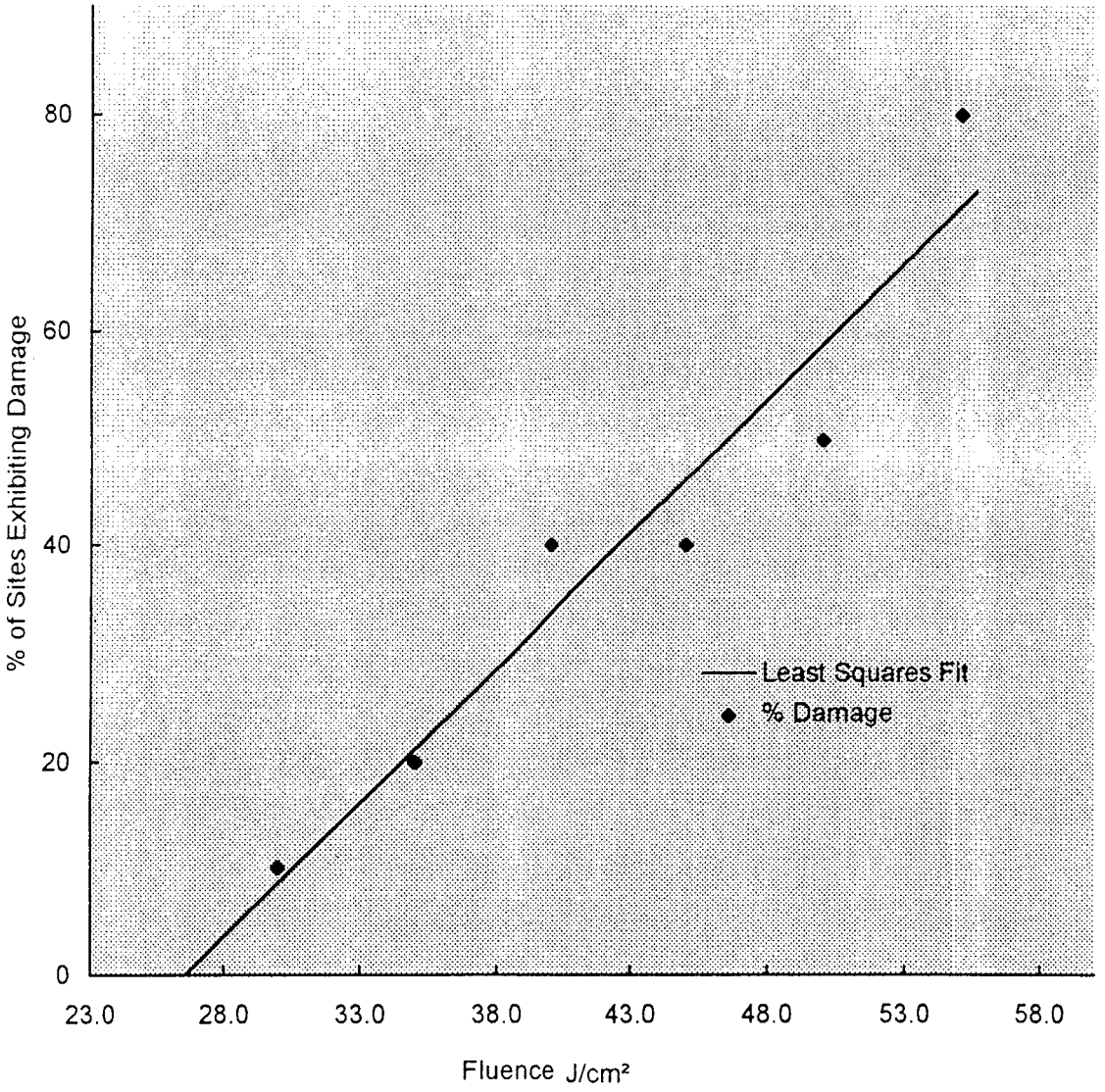
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-16 b			Fluence Range	23	60
Part No.	L-16					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	90

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data	
Fluence	# Dam	Out Of	Fluenc	% Dam				
30	1	10	30	10	# of data points	6	2.5	slope
35	2	10	35	20	# at 0%	0	-66.9	intercept
40	4	10	40	40	# at 100%	0	0.9219	R^2
45	4	10	45	40	# used in Linear Fit		26.59	J/cm² Threshold
50	5	10	50	50	Calculation	6	Line Fit Coordinates	
55	8	10	55	80	Total Number		26.5909	0.0
		---			of Sites	60	55.55	72.8

Laser Damage Frequency vs. Fluence

7008-DT L-16 b



"0" Probability of damage: 26.59 J/cm²

Pusewidth: 4 ns

Part # : L-16

R^2 = 0.9219

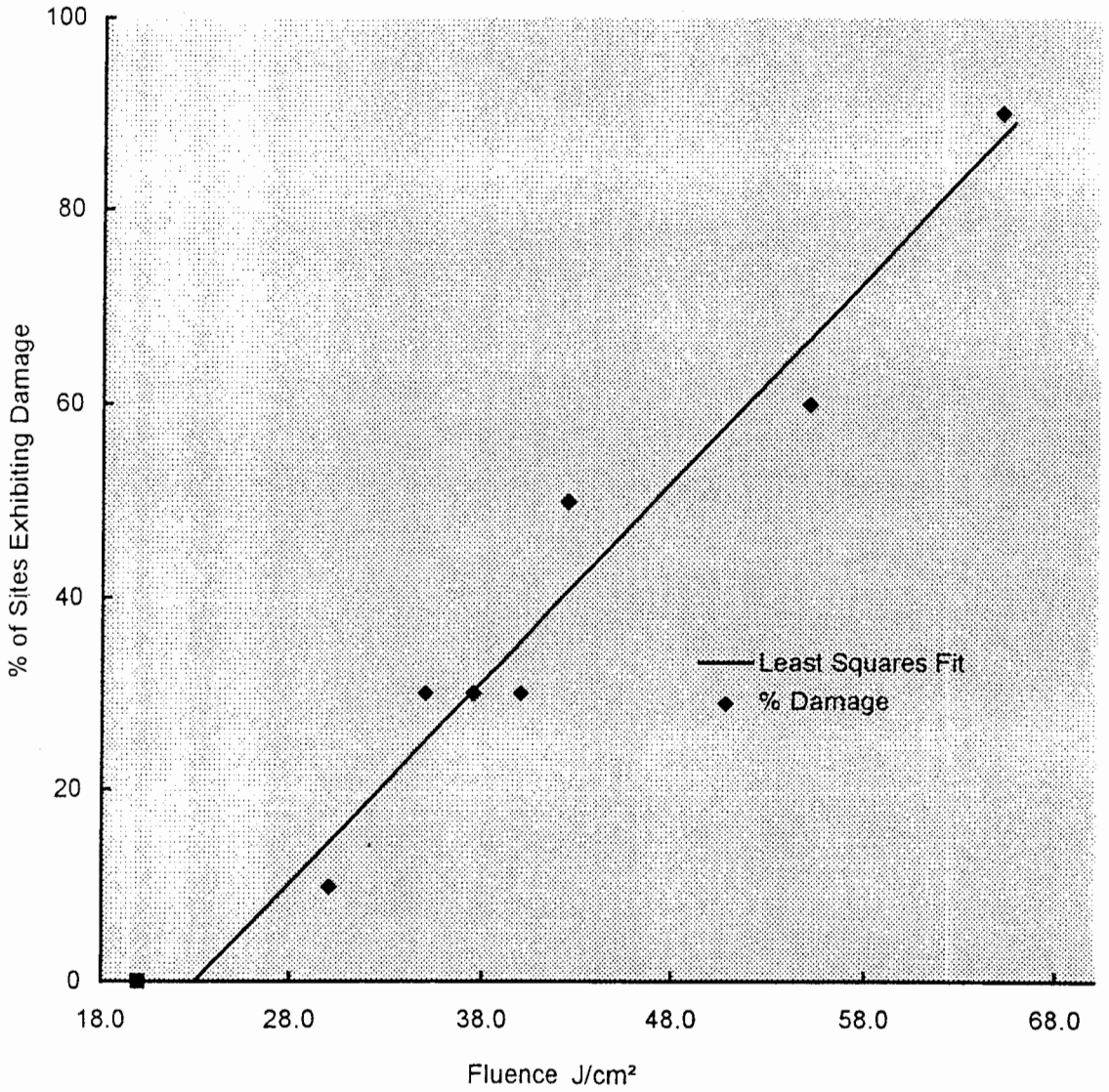
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-17 a			Fluence Range	18	70
Part No.	L-17					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data	
Fluence	# Dam	Out Of	Fluenc	% Dam				
20	0	10	20	0	# of data points	8	2.1	slope
30	1	10	30	10	# at 0%	1	-48.3	intercept
35	3	10	35	30	# at 100%	0	0.9484	R^2
37.5	3	10	37.5	30	# used in Linear Fit		23.08	J/cm² Threshold
40	3	10	40	30	Calculation	7	Line Fit Coordinates	
42.5	5	10	42.5	50	Total Number		23.0798	0.0
55	4	10	55	60	of Sites	80	65.65	89.0
65	9	10	65	90				

Laser Damage Frequency vs. Fluence

7008-DT L-17 a



"0" Probability of damage: 23.08 J/cm²

Pusewidth: 4 ns

Part # : L-17

R^2 = 0.9484

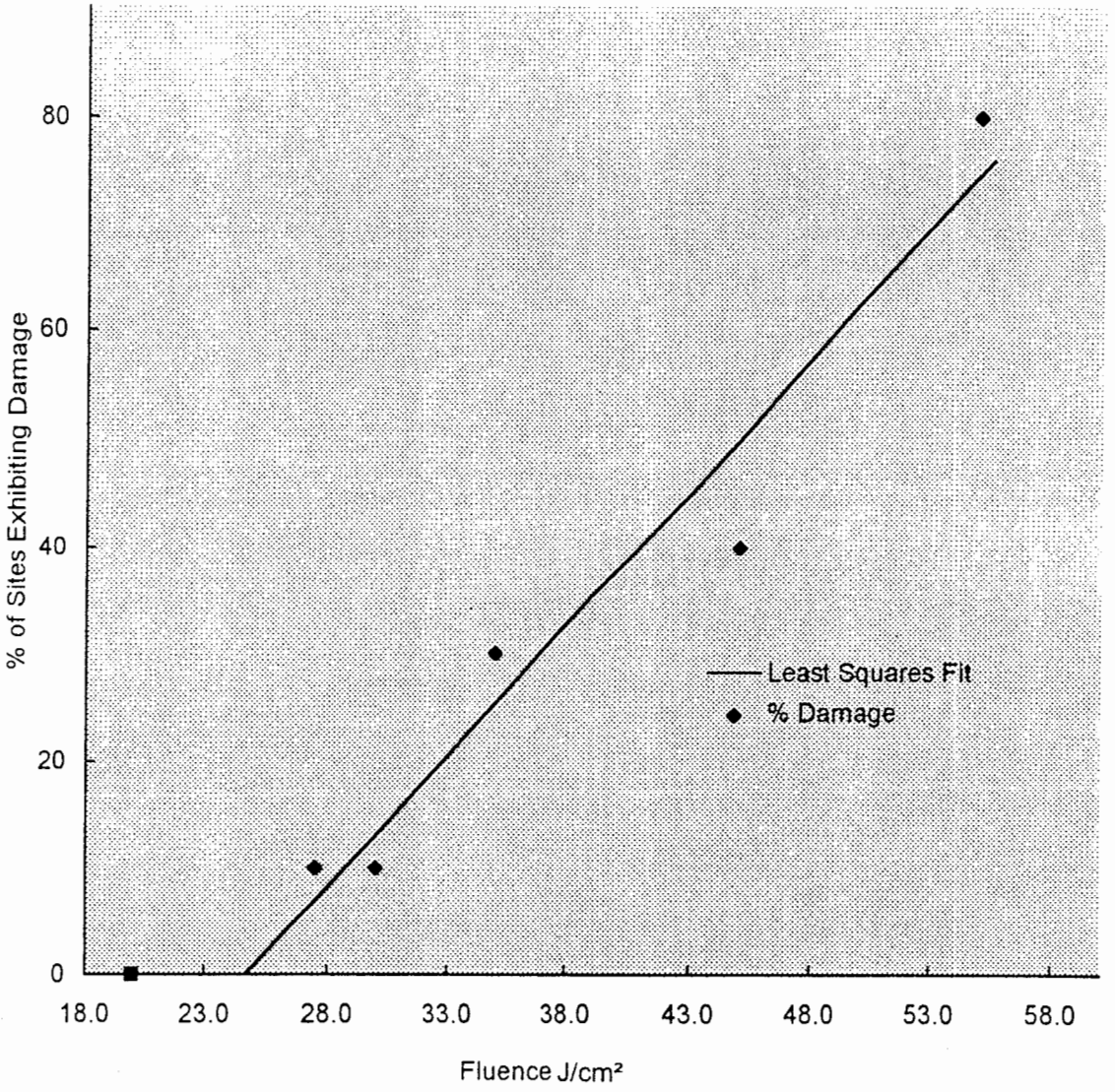
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-17 b			Fluence Range	18	60
Part No.	L-17					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	90

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
20	0	10	20	0	# of data points	6	2.5	slope	
27.5	1	10	27.5	10	# at 0%	1	-60.8	intercept	
30	1	10	30	10	# at 100%	0	0.9490	R^2	
35	3	10	35	30	# used in Linear Fit		24.69	J/cm²	Threshold
45	4	10	45	40	Calculation	5	Line Fit Coordinates		
55	8	10	55	80	Total Number		24.6875	0.0	
		---			of Sites	60	55.55	76.0	

Laser Damage Frequency vs. Fluence

7008-DT L-17 b



"0" Probability of damage: 24.69 J/cm²
Pusewidth: 4 ns
Part # : L-17
R^2 = 0.9490

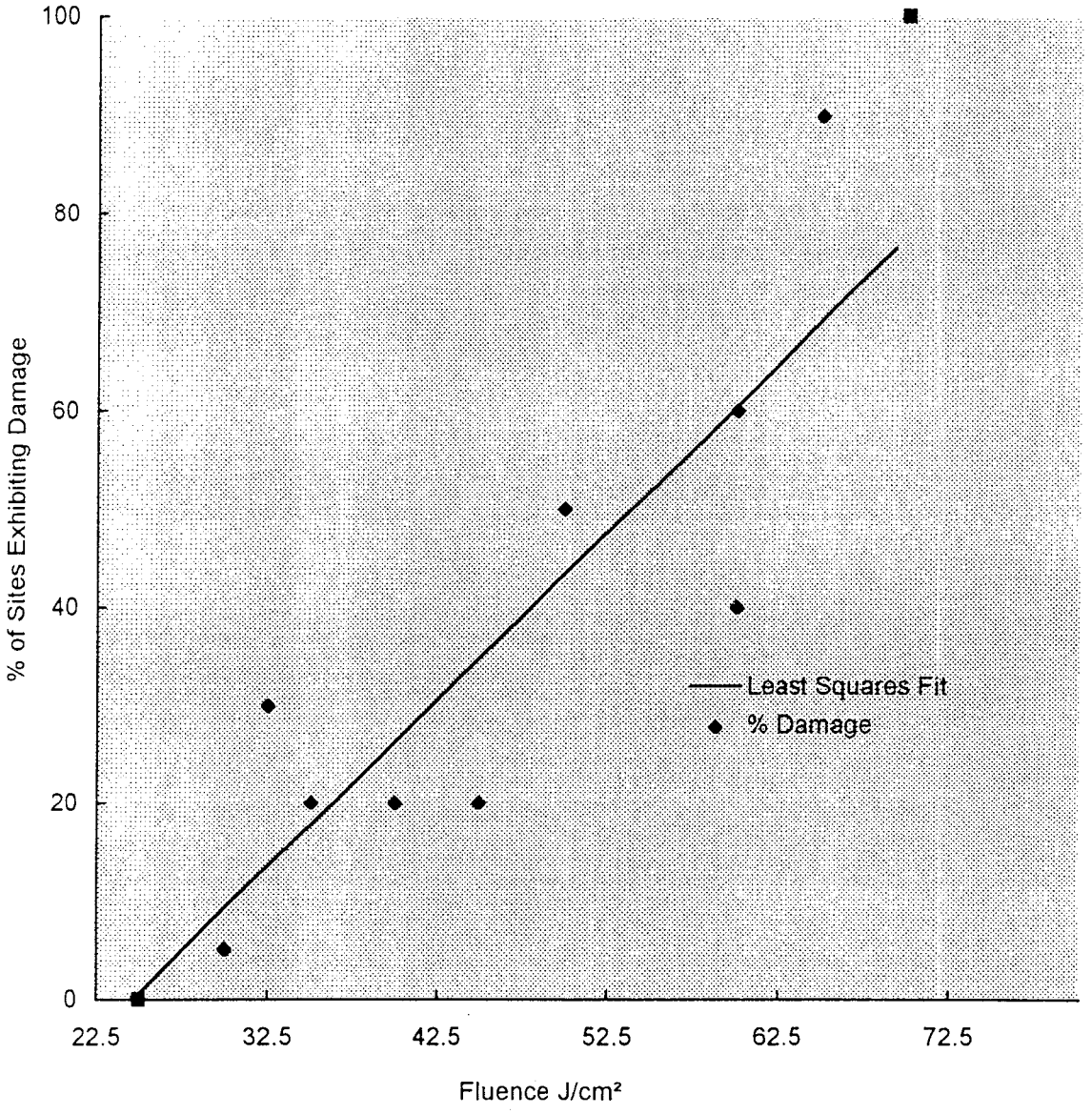
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-18 a			Fluence Range	22.5	80
Part No.	L-18					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	100

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
25	0	10	25	0	# of data points	11	1.7	slope	
30	1	20	30	5	# at 0%	1	-42.2	intercept	
32.5	3	10	32.5	30	# at 100%	1	0.7326	R^2	
35	2	10	35	20	# used in Linear Fit		24.64	J/cm²	Threshold
40	2	10	40	20	Calculation	9	Line Fit Coordinates		
45	2	10	45	20	Total Number		24.6446	0.0	
50	5	10	50	50	of Sites	120	69.3	76.4	
60	4	10	60	40					
60	6	10	60	60					
65	9	10	65	90					
70	10	10	70	100					

Laser Damage Frequency vs. Fluence

7008-DT L-18 a



"0" Probability of damage: 24.64 J/cm²

Pusewidth: 4 ns

Part # : L-18

R^2 = 0.7326

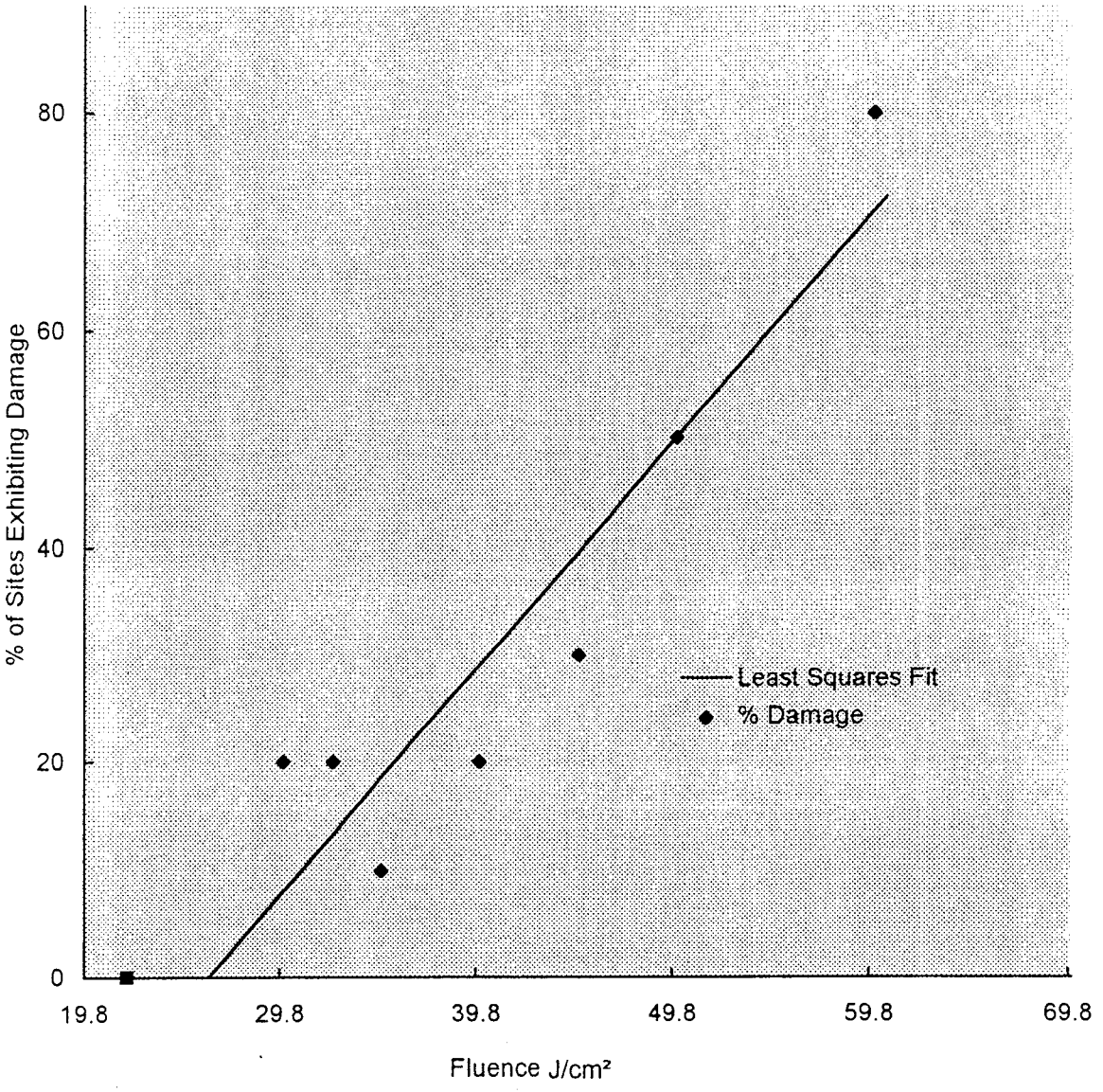
Laser Damage Threshold Plot Worksheet

Test No.	7008-DT L-18 b			Fluence Range	19.8	70
Part No.	L-18					
Pulse W.	4 ns	Out Of	10	Frequency Range	0	90

Raw Data Entry			Line Data		Summary of Raw Data		Fit Data		
Fluence	# Dam	Out Of	Fluenc	% Dam					
22	0	10	22	0	# of data points	8	2.1	slope	
30	2	10	30	20	# at 0%	1	-55.1	intercept	
32.5	2	10	32.5	20	# at 100%	0	0.8549	R^2	
35	1	10	35	10	# used in Linear Fit		26.17	J/cm²	Threshold
40	2	10	40	20	Calculation	7	Line Fit Coordinates		
45	3	10	45	30	Total Number		26.1725	0.0	
50	5	10	50	50	of Sites	80	60.6	72.5	
60	8	10	60	80					

Laser Damage Frequency vs. Fluence

7008-DT L-18 b



"0" Probability of damage: 26.17 J/cm²

Pusewidth: 4 ns

Part # : L-18

R^2 = 0.8549