Report: atr2jtest
Operator: BJ
Date: Fri Jan 06 13:40:05 1995
Template: JIC Fracture Toughness
Procedure: SE(B)
Batch: ATRsmlbend2

Test Summaries : <w-5jq>

	O
-- JIC Test Termination: --	O
End on maximum load	OOff
Maximum Load	O5000 Olbf
End on maximum COD	OOff
Maximum COD	O0.1 Oin
End on maximum displ.	OOff
Maximum Displacement	O-0.245 Oin
End on maximum Crack Length	OOff
Maximum Crack Length	O1 Oin
End on maximum Crack Extension	OOff
Maximum Crack Length Extension	O1 Oin
Termination Type	OControlled
Hydraulic Shutdown	OOn
	O
-- Final Precrack Lengths: --	O
Precrack length 1	O0.6134 Oin
Precrack length 2	O0.6167 Oin
Precrack length 3	O0.6166 Oin
Precrack length 4	O0.6263 Oin
Precrack length 5	O0.6276 Oin
Precrack length 6	O0.6279 Oin
Precrack length 7	O0.6265 Oin
Precrack length 8	O0.6248 Oin
Precrack length 9	O0.618 Oin
Average Precrack:	O0.622763 Oin
	O
-- Final JIC Crack Lengths: --	O
Final crack length 1	O0.7977 Oin
Final crack length 2	O0.7957 Oin
Final crack length 3	O0.7839 Oin
Final crack length 4	O0.7834 Oin
Final crack length 5	O0.7783 Oin
Final crack length 6	O0.7822 Oin
Final crack length 7	O0.7711 Oin
Final crack length 8	O0.7796 Oin
Final crack length 9	O0.7807 Oin
Average Physical Crack:	O0.782925 Oin
	O
-- Calculated Crack Lengths: --	O
Pre Test Normalized Compliance:	O123.057 O(none)
Calculated Pre Test Crack Length:	O0.691982 Oin
Test Termination Normalized Compliance:	O224.086 O(none)
Calculated Test Term. Crack Length:	O0.762228 Oin
	O

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Report:     atr2jtest
Operator:   BJ
Date:       Fri Jan 06 13:40:05 1995
Template:   JIC Fracture Toughness
Procedure:  SE(B)
Batch:      ATRsmlbend2


Test Summaries : <w-5jq>

      -- Run-Time Report: --                O
Test Duration:                              O464.846 OSec
Maximum Load:                               O1238.87 Olbf
Maximum COD:                                O0.0398709 Oin
Maximum Displacement:                       O0.057374 Oin
Run Time Parm Mods                          OYes
Test Termination:                           O
                                            O
   -- JIC Analysis Inputs ASTM E 813: --O
Upper LSF data range:                       O15 O%
Lower LSF data range:                       O85 O%
Blunting Factor M:                          O2 O(none)
Minimum J value:                            O0 Olbf/in
Modulus Factor Lambda:                      O1 O(none)
Delta a(p) offset:                          O-0.0025 Oin
                                            O
      -- JIC Analysis Calculations: --      O
Effective Yield Strength                    OAvg. of Yield & Ultimate
Unload/Reload Compliance                    OUnload & Reload
Rotational Correction                       OASTM E813-89
J Calculation                               OASTM E813-89
J-Delta a(p) Curve Fit                      OASTM E813-89
JIC Test Validity                           OASTM E813-89
                                            O
      -- JIC Test Results ASTM E 813: --O
Number of Data Points:                      O18
Number of Valid Data Points:                O8
Delta a(p) Min Limit Line:                  O0.00729899 Oin
Delta a(p) Max Limit Line:                  O0.0632579 Oin
Regression Slope dJQ/da at delta-aQ:        O16891.7 Olbf/in^2
J-Delta a(p) Equation:                      O
   J (in-lbf/in^2) =                        O
      c1 * (Delta a(p) (in)) ^^ c2          O
   c1                                       O3392
   c2                                       O0.5118
JQ                                          O312.206 Oin-lbf/in^2
Delta a(Q)                                  O0.00946285 Oin
Kj Value:                                   O92827.3 Olbf/in^1.5
                                            O
-- Validation Criteria ASTM E 813-89: --O
ASTM E813-89 Section 8.4.2:                 O
   tp = 76.63 Sec                           O
   Is tp b/w 6 Sec                          O
      and 600 Sec?                          OYes
ASTM E813-89 Section 7.1.1:                 O
```

Report: atr2jtest
Operator: BJ
Date: Fri Jan 06 13:40:05 1995
Template: JIC Fracture Toughness
Procedure: SE(B)
Batch: ATRsmlbend2

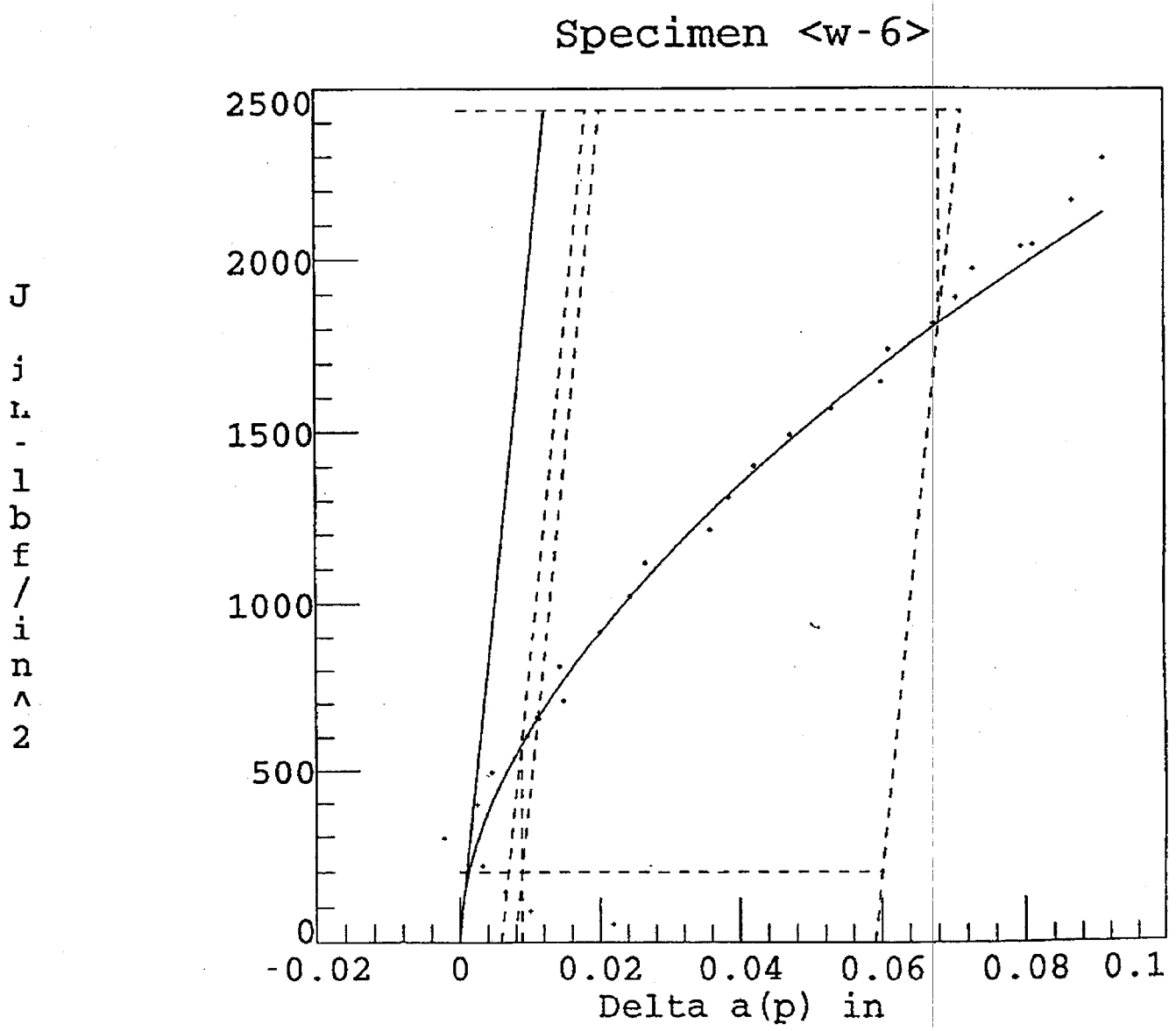
Test Summaries : <w-5jq>

25 JQ/SFS = 0.07944 in	O
Is b0 > 25 JQ/SFS?	OYes
Is B > 25 JQ/SFS?	OYes
ASTM E813-89 Section 7.2.2:	O
a0/W = 0.624	O
Is a0/W b/w 0.5 & 0.75?	OYes
ASTM E813-89 Section 7.5:	O
Side grooving = 20.32 pct.	O
Is side grooving <= 25 pct.?	OYes
ASTM E813-89 Section 7.6.4:	O
Precrack extension = 0.1228 in	O
Is precrack extension >= 0.05a0	O
and >= 0.05118 in?	OYes
ASTM E813-89 Section 7.6.1:	O
PL = 1540 lbf	O
ASTM E813-89 Section 8.4.3.6:	O
Is the load range of all compliance	O
unloads <= 0.2PL or 0.5 times	O
the current load?	OYes
ASTM E813-89 Section 9.3.1:	O
Do all points used for regression lie	O
b/w Delta a(p) min & max?	OYes
ASTM E813-89 Section 9.2.2:	O
Does at least one data point lie b/w	O
the 0.005906 in & 0.01969 in excl.	OYes
Does at least one data point lie b/w	O
the 0.03937 in & 0.05906 in excl.	OYes
ASTM E813-89 Section 9.3.2:	O
Were at least 4 data points used for	O
the J-Delta a(p) regression?	OYes
ASTM E813-89 Section 9.4.1.3:	O
Is the slope of the regression curve	O
at JQ less than SFS?	OYes
ASTM E813-89 Section 9.4.1.5:	O
Are all precrack lengths within	O
7 pct. of the average?	OYes
ASTM E813-89 Section 9.4.1.5:	O
Are all final crack lengths within	O
7 pct. of the average?	OYes
ASTM E813-89 Section 9.4.1.6:	O
Are both near surface crack	O
extensions within 0.02W of the	O
extension at the center?	OYes
ASTM E813-89 Section 9.4.1.7:	O
Is the difference between the crack	O

```
Report:     atr2jtest
Operator:   BJ
Date:       Fri Jan 06 13:40:05 1995
Template:   JIC Fracture Toughness
r  cedure:  SE(B)
..  .ch:    ATRsmlbend2

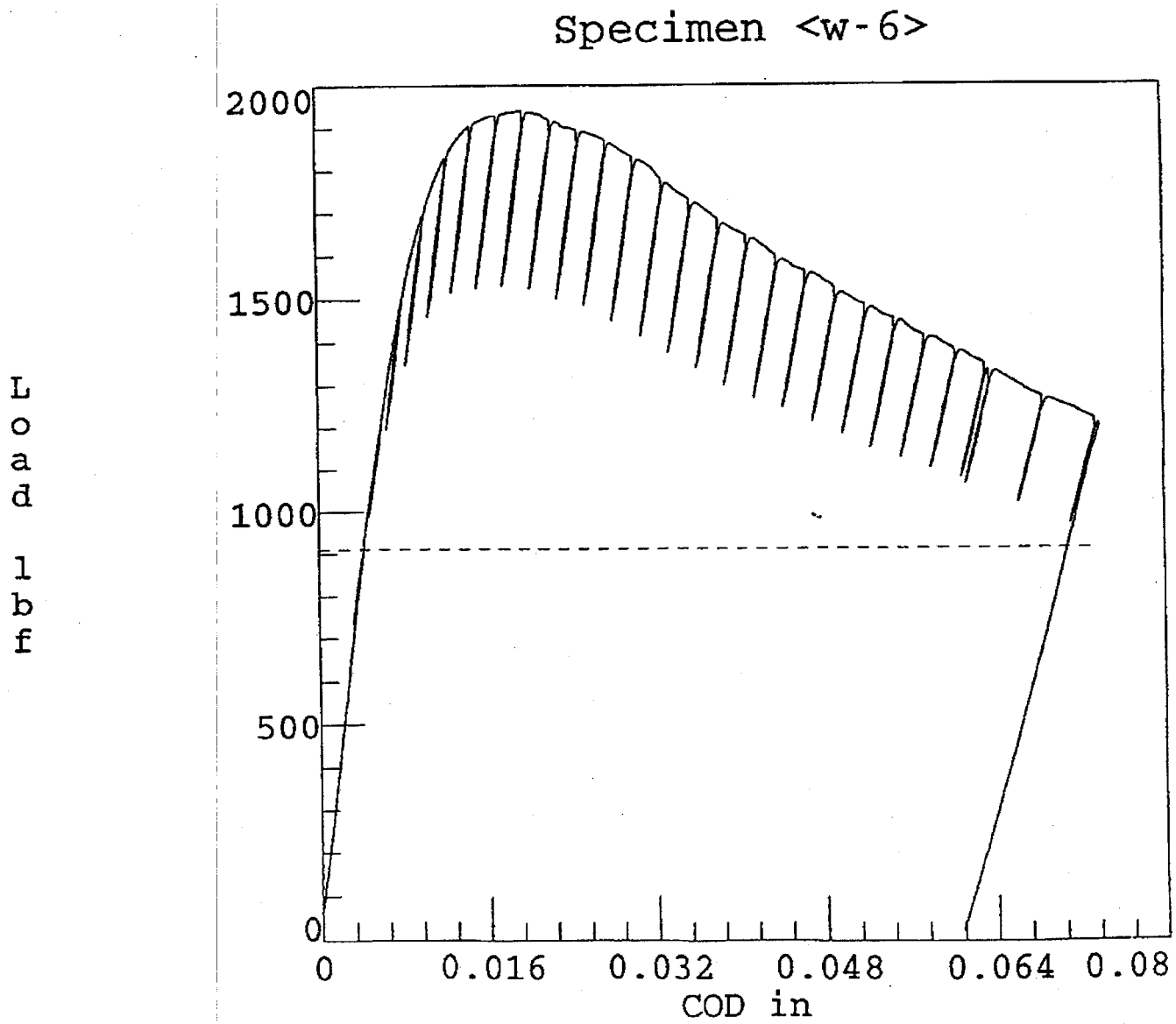

Test Summaries : <w-5jq>

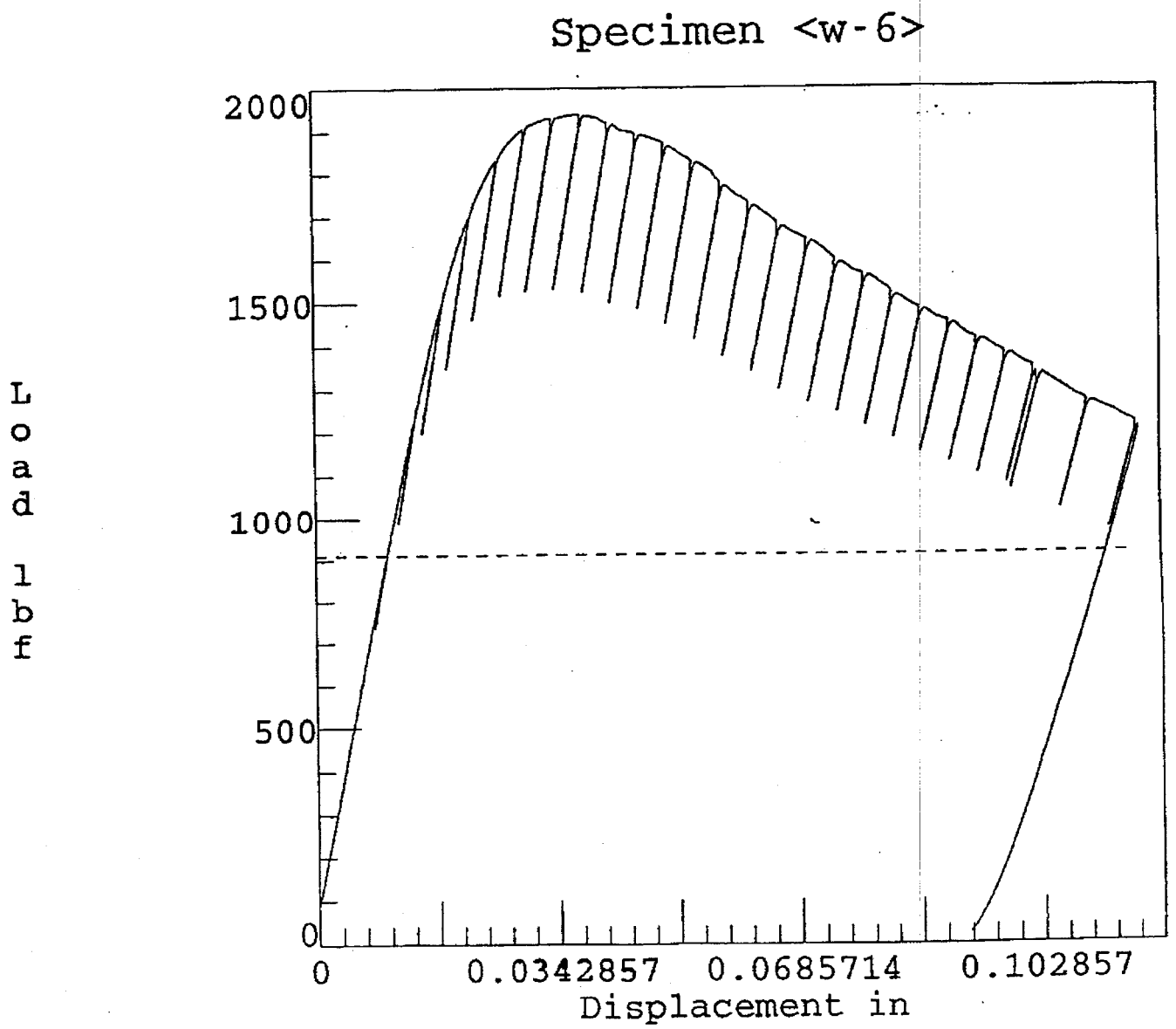
      extensions found from compliance  O
      and the 9-point averages within   O
      15 pct. of either of the 9-point  O
      average or Delta a(p) max?        ONo
ASTM E813-89 Section 9.4.1.7:           O
   EM from 9-point precrack front       O
      average = 1.688e+07 lbf/in^2      O
   Is EM within 10 pct. of nominal E?   ONo
Were the J values and curve fit         O
   calculated per ASTM E813-89?         OYes
Is JQ = JIC per ASTM E813-89?           ONo
JQ Value (ASTM E813-89):                O312.206 Oin-lbf/in^2
```



JQ = 657.843 in-lbf/in^2

Delta a(Q) = 0.0112218 in


Specimen <w-6>
2000
1500
1000
500
0
Load lbf
0
0.016
0.032
0.048
0.064
0.08
COD in


Specimen <w-6>
2000
1500
1000
500
0
Load lbf
0
0.0342857
0.0685714
0.102857
Displacement in

Report: atr3jtest
Operator: BJ
Date: Fri Jan 06 10:29:44 1995
T plate: JIC Fracture Toughness
Procedure: SE(B)
Batch: ATRsmlbend3

J-Delta a(p) Data Tables : <w-6jic>

Specimen <w-6>

Step	J (in-lbf/in^2)	Delta a(p) (in)	Load (lbf)	COD (in)
1	50.3398	0.021878	902.253	0.004113
2	86.6737	0.010006	1217.57	0.005940
3	144.285	0.006444	1480.16	0.007852
4	216.710	0.003247	1675.56	0.009972
5	294.914	-0.002132	1804.79	0.012229
6	395.128	0.002581	1873.02	0.014607
7	493.789	0.004595	1896.11	0.017122
8	603.862	0.009681	1903.00	0.019621
9	709.133	0.014911	1882.32	0.022205
10	812.272	0.014336	1858.20	0.024841
11	917.335	0.020114	1833.73	0.027391
12	1021.01	0.024471	1793.07	0.030097
13	1118.24	0.026612	1745.17	0.032785
14	1214.00	0.035898	1694.51	0.035438
15	1308.80	0.038507	1650.75	0.038195
16	1399.77	0.042140	1613.18	0.040883
17	1490.16	0.047176	1567.70	0.043674
18	1567.31	0.053079	1533.23	0.046379
19	1644.40	0.060137	1492.57	0.049153
20	1738.13	0.061080	1454.66	0.051927
21	1814.14	0.067600	1426.41	0.054667
22	1890.67	0.070710	1388.50	0.057510
23	1973.16	0.073095	1356.11	0.060284
24	2036.21	0.079720	1320.95	0.063110
25	2042.78	0.081357	1302.00	0.063489
26	2171.22	0.086820	1245.14	0.068434
27	2296.37	0.091234	1190.35	0.073414

Report: atr3jtest
Operator: BJ
Date: Fri Jan 06 10:29:44 1995
T plate: JIC Fracture Toughness
Procedure: SE(B)
Batch: ATRsmlbend3

J-Delta a(p) Data Tables : <w-6jic>

Specimen <w-6>

Step	Displ. (in)	J Exclusion	Delta a(p) Max/Min	Displ. for J calc. (in)
1	0.009909	Invalid	Valid	0.004431
2	0.013906	Invalid	Valid	0.006514
3	0.017869	Invalid	Invalid	0.008882
4	0.021832	Invalid	Invalid	0.011659
5	0.025829	Invalid	Invalid	0.014871
6	0.029861	Invalid	Invalid	0.018489
7	0.033893	Invalid	Invalid	0.022380
8	0.037890	Valid	Valid	0.026336
9	0.041870	Valid	Valid	0.030441
10	0.045902	Valid	Valid	0.034619
11	0.049847	Valid	Valid	0.038713
12	0.053948	Valid	Valid	0.043061
13	0.057893	Valid	Valid	0.047297
14	0.061908	Valid	Valid	0.051619
15	0.065922	Valid	Valid	0.055899
16	0.069902	Valid	Valid	0.060107
17	0.073917	Valid	Valid	0.064398
18	0.077862	Valid	Valid	0.068553
19	0.081894	Valid	Valid	0.072832
20	0.085908	Valid	Valid	0.077076
21	0.090026	Valid	Valid	0.081366
22	0.093920	Invalid	Invalid	0.085490
23	0.097883	Invalid	Invalid	0.089649
24	0.101880	Invalid	Invalid	0.093860
25	0.102397	Invalid	Invalid	0.094492
26	0.109392	Invalid	Invalid	0.101832
27	0.116387	Invalid	Invalid	0.109160

Report: atr3jtest
Operator: BJ
Date: Fri Jan 06 10:29:44 1995
T plate: JIC Fracture Toughness
Procedure: SE(B)
Batch: ATRsmlbend3

J-Delta a(p) Data Tables : <w-6jic>

Specimen <w-6>

Step	Normalized Compliance ((none))	Energy for J calc. (in-lbf)
1	68.5143	2.44886
2	71.5032	4.69024
3	66.6667	7.94583
4	63.5498	12.4027
5	65.5031	18.0904
6	65.0227	24.8632
7	69.6497	32.3278
8	68.9149	39.9730
9	72.8662	47.8870
10	78.9703	55.8276
11	79.9190	63.5290
12	85.2301	71.5491
13	93.1046	79.1975
14	93.7678	86.7544
15	101.473	94.0460
16	107.443	101.026
17	110.876	107.981
18	118.419	114.528
19	124.032	121.132
20	130.433	127.494
21	132.839	133.774
22	142.206	139.671
23	148.098	145.483
24	151.634	151.222
25	151.252	152.058
26	163.978	161.606
27	180.093	170.714

Report: atr3jtest
Operator: BJ
Date: Fri Jan 06 10:31:42 1995
Template: JIC Fracture Toughness
Procedure: SE(B)
Batch: ATRsmlbend3

Test Summaries : <w-6jic>

	O
-- Identification: --	O
Template:	OJIC Fracture Toughness
Procedure:	OSE(B)
General Information:	O
This Test is designed to run SE(B)	style specimens.The test will be run u
Batch:	OATRsmlbend3
Comments:	O
Specimen Name:	Ow-6
Comments:	O
	O
-- Geometry: --	O
Specimen Geometry:	OSE(B)
Width	O0.999 Oin
Notch Length	O0.5 Oin
Thickness	O0.503 Oin
Net Thickness	O0.4 Oin
Span	O4 Oin
Modulus of Elasticity	O3.311e+07 Olbf/in^2
Yield Strength	O89900 Olbf/in^2
Ultimate Tensile Strength	O106600 Olbf/in^2
Poisson's Ratio	O0.3 O(none)
Crack Plane Orientation	O
Test Temperature	O125 Odeg_F
Compliance Calibration File:	OC:\ts2\79050\SE(B).CPL
K-Calibration File:	OC:\ts2\79050\SE(B).KCL
	O
-- Precrack Parameters: --	O
Final Kmax	O20000 Olbf/in^1.5
Load Ratio, R (min/max)	O0.1 O(none)
Test Frequency	O10 OHz
Final Crack Length	O0.645 Oin
Cycle Limited	OOff
Maximum Number of Cycles	O10000
Manual measurement	OOff
Compliance measurement	OOn
Upper LSF data range	O90 O%
Lower LSF data range	O10 O%
Automatic Inspection Hold	OOff
Inspection Interval (cycles)	O10000
	O
-- Precrack Results: --	O
Precrack Cycles	O0
Precrack Kmax	O0 Olbf/in^1.5
Precrack Final K	O0 Olbf/in^1.5

Report: atr3jtest
Operator: BJ
Date: Fri Jan 06 10:31:42 1995
Template: JIC Fracture Toughness
Procedure: SE(B)
Batch: ATRsmlbend3

Test Summaries : <w-6jic>

Precrack Pmax	O900 Olbf
Precrack Final P	O900 Olbf
Precrack crack length	O0.5993 Oin
Precrack user comment	Oonly precrack length is valid
	O
-- Precrack Setup: --	O
Load Sensor:	OForce 1
Load Range:	O10000 Olbf
COD Sensor:	OLength 2
COD Range:	O0.5 Oin
	O
-- JIC Execution Parameters: --	O
Precycle Load	O-500 Olbf
Test Control	ODisplacement
Ramp Rate	O-0.0002 Oin/Sec
UnLoad on Load Step	OOff
Load Step	O300 Olbf
UnLoad on COD Step	OOff
COD Step	O0.001 Oin
UnLoad on Displacement Step	OOn
Displacement Step	O0.004 Oin
Unload Pct of Current Load	OOn
Percent Unload	O20 O%
Unload Absolute	OOff
Absolute Unload	O300 Olbf
Number of Unloads	O2
Crack Propagation Hold Time	O2 OSec
Unload Rate	O300 Olbf/Sec
Reload Rate	O300 Olbf/Sec
Ramp To Initial Load	OOn
Pct Of Final Precrack Load	O100 O%
Load Ramp Rate	O-100 Olbf/Sec
	O
-- JIC Test Setup: --	O
Load Sensor:	OForce 1
Load Range:	O10000 Olbf
COD Sensor:	OLength 2
COD Range:	O0.5 Oin
Displacement Sensor:	OLength 1
Displacement Range:	O0.5 Oin
Frame Stiffness:	O164700 Olbf/in
	O
-- JIC Data Storage: --	O
Event Log Filename:	Oelog.txt
Raw Data Filename:	Ojgf.000

Report: atr3jtest
Operator: BJ
Date: Fri Jan 06 10:31:42 1995
Template: JIC Fracture Toughness
F cedure: SE(B)
B..ch: ATRsmlbend3

Test Summaries : <w-6jic>

	O
-- JIC Test Termination: --	O
End on maximum load	OOff
Maximum Load	O5000 Olbf
End on maximum COD	OOff
Maximum COD	O0.1 Oin
End on maximum displ.	OOff
Maximum Displacement	O-0.245 Oin
End on maximum Crack Length	OOff
Maximum Crack Length	O1 Oin
End on maximum Crack Extension	OOff
Maximum Crack Length Extension	O1 Oin
Termination Type	OControlled
Hydraulic Shutdown	OOn
	O
-- Final Precrack Lengths: --	O
Precrack length 1	O0.6353 Oin
Precrack length 2	O0.6387 Oin
Precrack length 3	O0.6414 Oin
Precrack length 4	O0.6441 Oin
F crack length 5	O0.6456 Oin
Precrack length 6	O0.6452 Oin
Precrack length 7	O0.6407 Oin
Precrack length 8	O0.6388 Oin
Precrack length 9	O0.6399 Oin
Average Precrack:	O0.641513 Oin
	O
-- Final JIC Crack Lengths: --	O
Final crack length 1	O0.7663 Oin
Final crack length 2	O0.7576 Oin
Final crack length 3	O0.7532 Oin
Final crack length 4	O0.7526 Oin
Final crack length 5	O0.7417 Oin
Final crack length 6	O0.7468 Oin
Final crack length 7	O0.734 Oin
Final crack length 8	O0.7435 Oin
Final crack length 9	O0.7532 Oin
Average Physical Crack:	O0.748644 Oin
	O
-- Calculated Crack Lengths: --	O
Pre Test Normalized Compliance:	O77.1986 O(none)
Calculated Pre Test Crack Length:	O0.62737 Oin
Test Termination Normalized Compliance:	O161.54 O(none)
Calculated Test Term. Crack Length:	O0.726604 Oin
	O

```
Report:     atr3jtest
Operator:   BJ
Date:       Fri Jan 06 10:31:42 1995
Template:   JIC Fracture Toughness
Procedure:  SE(B)
Batch:      ATRsmlbend3


Test Summaries : <w-6jic>

      -- Run-Time Report: --                  O
Test Duration:                                O868.302 OSec
Maximum Load:                                 O1844.7 Olbf
Maximum COD:                                  O0.0733495 Oin
Maximum Displacement:                         O0.116695 Oin
Run Time Parm Mods                            OYes
Test Termination:                             O
                                              O
   -- JIC Analysis Inputs ASTM E 813: --      O
Upper LSF data range:                         O15 O%
Lower LSF data range:                         O85 O%
Blunting Factor M:                            O2 O(none)
Minimum J value:                              O200 Olbf/in
Modulus Factor Lambda:                        O1 O(none)
Delta a(p) offset:                            O-0.008 Oin
                                              O
      -- JIC Analysis Calculations: --        O
Effective Yield Strength                      OAvg. of Yield & Ultimate
Unload/Reload Compliance                      OUnload & Reload
Rotational Correction                         OASTM E813-89
J Calculation                                 OASTM E813-89
J-Delta a(p) Curve Fit                        OASTM E813-89
JIC Test Validity                             OASTM E813-89
                                              O
      -- JIC Test Results ASTM E 813: --      O
Number of Data Points:                        O27
Number of Valid Data Points:                  O14
Delta a(p) Min Limit Line:                    O0.00883088 Oin
Delta a(p) Max Limit Line:                    O0.0683041 Oin
Regression Slope dJQ/da at delta-aQ:          O32940.8 Olbf/in^2
J-Delta a(p) Equation:                        O
   J (in-lbf/in^2) =                          O
      c1 * (Delta a(p) (in)) ^^ c2            O
   c1                                         O8186
   c2                                         O0.5613
JQ                                            O657.843 Oin-lbf/in^2
Delta a(Q)                                    O0.0112218 Oin
Kj Value:                                     O147585 Olbf/in^1.5
                                              O
-- Validation Criteria ASTM E 813-89: --      O
ASTM E813-89 Section 8.4.2:                   O
   tp = 18.77 Sec                             O
   Is tp b/w 6 Sec                            O
      and 600 Sec?                            OYes
ASTM E813-89 Section 7.1.1:                   O
```

```
Report:     atr3jtest
Operator:   BJ
Date:       Fri Jan 06 10:31:42 1995
Template:   JIC Fracture Toughness
!  :edure:  SE(B)
B..ch:      ATRsmlbend3

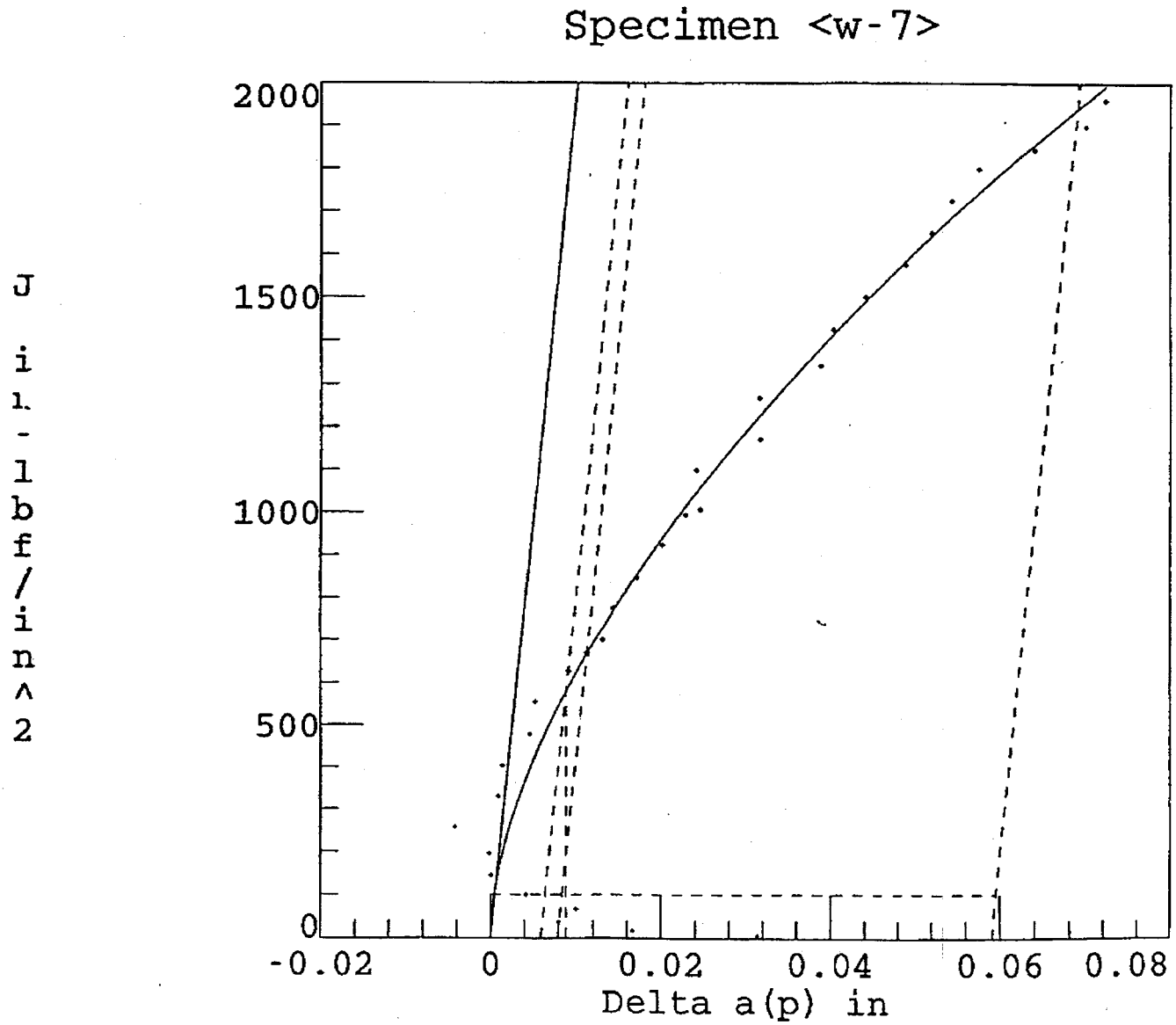

Test Summaries : <w-6jic>

   25 JQ/SFS = 0.1674 in                O
   Is b0 > 25 JQ/SFS?                   OYes
   Is B > 25 JQ/SFS?                    OYes
ASTM E813-89 Section 7.2.2:             O
   a0/W = 0.6422                        O
   Is a0/W b/w 0.5 & 0.75?              OYes
ASTM E813-89 Section 7.5:               O
   Side grooving = 20.48 pct.           O
   Is side grooving <= 25 pct.?         OYes
ASTM E813-89 Section 7.6.4:             O
   Precrack extension = 0.1415 in       O
   Is precrack extension >= 0.05a0      O
      and >= 0.05118 in?                OYes
ASTM E813-89 Section 7.6.1:             O
   PL = 2275 lbf                        O
ASTM E813-89 Section 8.4.3.6:           O
   Is the load range of all compliance  O
      unloads <= 0.2PL or 0.5 times     O
      the current load?                 OYes
ASTM E813-89 Section 9.3.1:             O
   )o all points used for regression lieO
      b/w Delta a(p) min & max?         OYes
ASTM E813-89 Section 9.2.2:             O
   Does at least one data point lie b/w O
      the 0.005906 in & 0.01969 in excl.OYes
   Does at least one data point lie b/w O
      the 0.03937 in & 0.05906 in excl. OYes
ASTM E813-89 Section 9.3.2:             O
   Were at least 4 data points used for O
      the J-Delta a(p) regression?      OYes
ASTM E813-89 Section 9.4.1.3:           O
   Is the slope of the regression curve O
      at JQ less than SFS?              OYes
ASTM E813-89 Section 9.4.1.5:           O
   Are all precrack lengths within      O
      7 pct. of the average?            OYes
ASTM E813-89 Section 9.4.1.5:           O
   Are all final crack lengths within   O
      7 pct. of the average?            OYes
ASTM E813-89 Section 9.4.1.6:           O
   Are both near surface crack          O
      extensions within 0.02W of the    O
      extension at the center?          OYes
ASTM E813-89 Section 9.4.1.7:           O
   Is the difference between the crack  O
```

Report: atr3jtest
Operator: BJ
Date: Fri Jan 06 10:31:42 1995
Template: JIC Fracture Toughness
Procedure: SE(B)
Batch: ATRsmlbend3

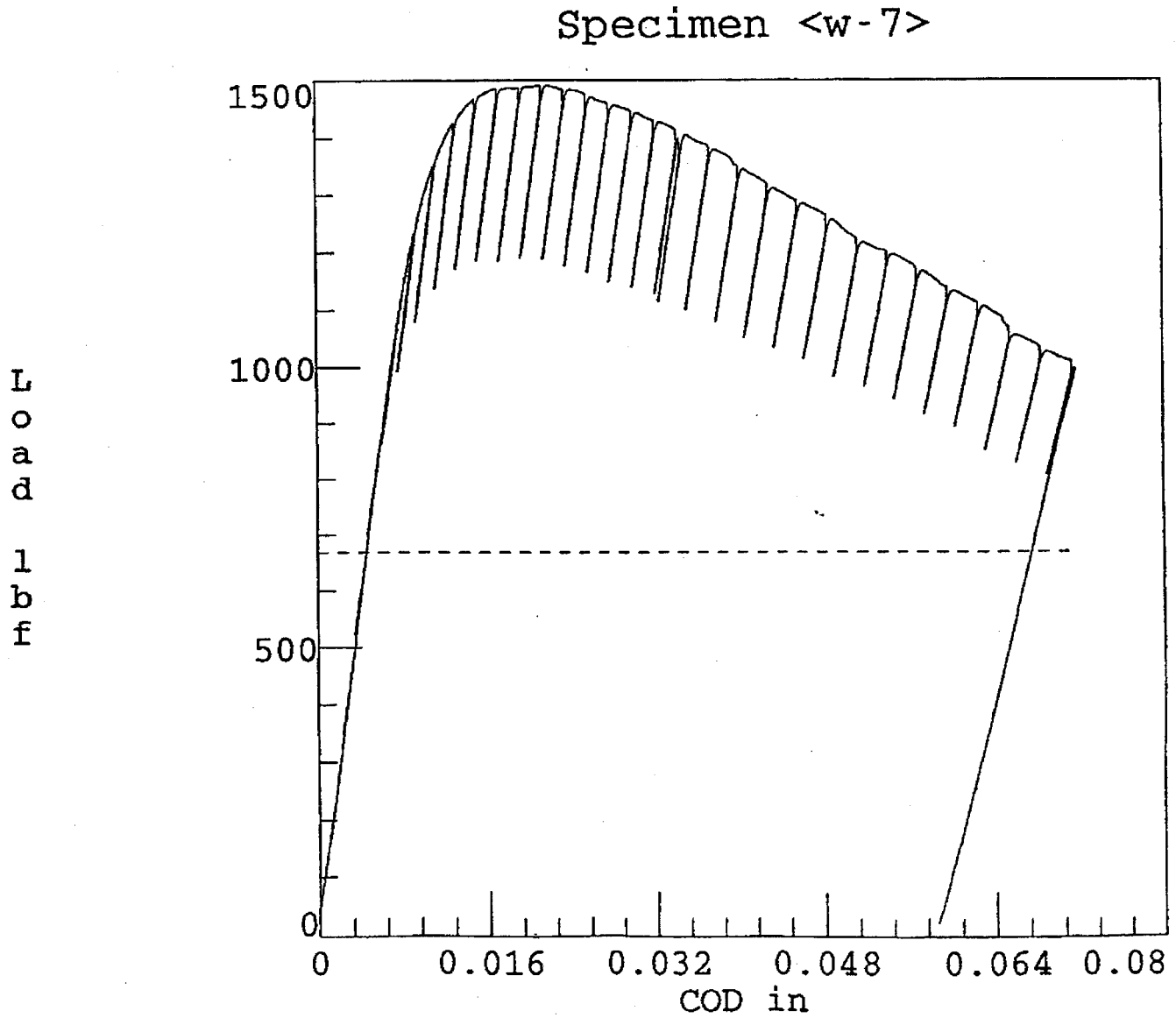
Test Summaries : <w-6jic>

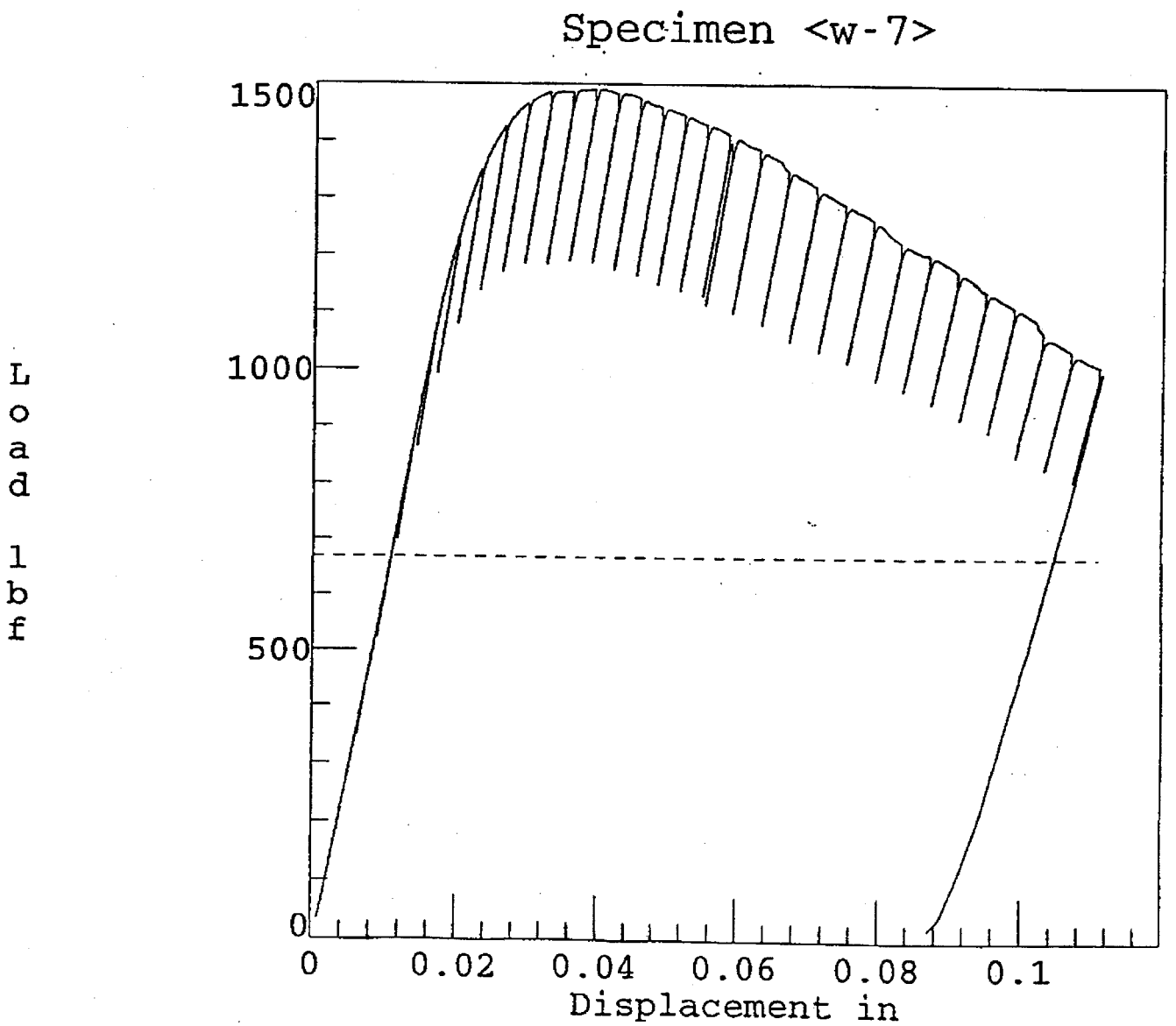
extensions found from compliance	O
and the 9-point averages within	O
15 pct. of either of the 9-point	O
average or Delta a(p) max?	OYes
ASTM E813-89 Section 9.4.1.7:	O
EM from 9-point precrack front	O
average = 3.642e+07 lbf/in^2	O
Is EM within 10 pct. of nominal E?	OYes
Were the J values and curve fit	O
calculated per ASTM E813-89?	OYes
Is JQ = JIC per ASTM E813-89?	OYes
JIC Value (ASTM E813-89):	O657.843 Oin-lbf/in^2



JQ = 668.231 in-lbf/in^2

Delta a(Q) = 0.0112747 in


Specimen <w-7>
1500
1000
500
0
Load lbf
0
0.016
0.032
0.048
0.064
0.08
COD in


Specimen <w-7>
1500
1000
500
0
Load lbf
0
0.02
0.04
0.06
0.08
0.1
Displacement in

Report: atr2jtest
Operator: BJ
Date: Fri Jan 06 09:30:36 1995
T plate: JIC Fracture Toughness
k cedure: SE(B)
Batch: ATRsmlbend2

J-Delta a(p) Data Tables : <w-7jic>

Specimen <w-7>

Step	J (in-lbf/in^2)	Delta a(p) (in)	Load (lbf)	COD (in)
1	5.70865	0.031433	228.196	0.001460
2	17.6263	0.016655	426.347	0.002856
3	36.5370	0.008027	640.350	0.004320
4	66.8403	0.009968	857.454	0.005819
5	100.309	0.004160	1062.50	0.007508
6	144.780	3.64e-05	1223.09	0.009179
7	195.214	-0.000146	1334.74	0.011023
8	258.129	-0.004189	1405.04	0.012952
9	330.208	0.000940	1442.26	0.014934
10	403.396	0.001400	1460.18	0.017002
11	477.764	0.004613	1461.21	0.019086
12	554.437	0.005275	1464.31	0.021189
13	627.053	0.009163	1456.39	0.023291
14	700.904	0.013104	1447.43	0.025462
15	777.034	0.014338	1431.23	0.027598
16	848.088	0.017092	1420.89	0.029718
17	923.920	0.020096	1403.66	0.031906
18	994.623	0.022892	1386.09	0.034094
19	1008.09	0.024609	1369.54	0.034439
20	1098.34	0.024157	1358.86	0.037144
21	1171.17	0.031692	1324.40	0.039918
22	1268.19	0.031566	1293.73	0.042726
23	1342.57	0.038776	1265.82	0.045535
24	1426.08	0.040284	1238.94	0.048326
25	1500.33	0.044075	1200.34	0.051152
26	1577.40	0.048827	1178.63	0.053961
27	1649.72	0.052005	1150.03	0.056855
28	1723.71	0.054259	1116.60	0.059681
29	1798.68	0.057480	1089.38	0.062576
30	1843.51	0.063951	1043.54	0.065488
31	1898.94	0.069882	1012.53	0.068382
32	1960.96	0.072156	987.028	0.071294