APRIL 3,1998

TEST REPORT #98188

CURRENT CARRYING CAPACITY
FWJ AND FWS SERIES

SAMTEC

APPROVED BY: MAX PEEL
PRESIDENT AND DIRECTOR OF ADVANCED RESEARCH
CONTECH RESEARCH, INC.

Contech Research

CERTIFICATION

This is to certify that the evaluation described herein was designed and executed by personnel of Contech Research, Inc. It was performed in concurrence of Samtec of New Albany, IN who was the test sponsor.

All equipment and measuring instruments used during testing were calibrated and traceable to NIST according to ISO 10012-1 and ANSI/NCSL Z540-1, as applicable.

All data, raw and summarized, analysis and conclusions presented herein are the property of the test sponsor. No copy of this report, in part or in full, shall be forwarded to any agency, customer, etc., by Contech Research without the written approval of the test sponsor.

Max Peel
President

MP:js

Contech Research

ID#	Next Cal	Last Cal	Equipment Name	Manufacturer	Model #	Serial #	Accuracy	Freq.Cal
144			Plotter	Hewlett Packard	7470A	2250A-19081	See Specification	N/A
279	7/1/98	7/1/97	Power Supply 30 Amps	Hewlett Packard	6033A	2642A02247	See Specification	12 mon.
440	3/20/99	3/20/97	Scanner Main Frame	Keithley Co.	706	540957	See Manual	24 mon.
487			Computer	Twilight Co.	386-40	N/A	N/A	N/A
587			Computer	Magnavox Co.	386-20	10531030	N/A	N/A
634	5/4/98	11/4/97	Digital Multimeter	Hewlett Packard	34401A	U.S.36026745	See Man.	6 mon.

TEST RESULTS

PROJECT NO.: 98188	SPECIFICATION: EIA364, TP70
PART NO.: FWJ & FWS Series	PART DESCRIPTION: Headers
SAMPLE SIZE: One Each	TECHNICIAN: RVO
START DATE: 4-2-98	COMPLETE DATE: 4-3-98
ROOM AMBIENT: 22°C	RELATIVE HUMIDITY: 38%
EQUIPMENT ID#: 144, 279, 440, 487, 587, 634	

CURRENT CARRYING CAPACITY

PURPOSE:

To establish the current carrying capacity of the test sample under evaluation. This is achieved by determining the temperature rise resulting at the contact interface at specified current levels. The temperature rise at a given current level plus the ambient operating temperature should not exceed the temperature rating of the test sample. Thus, the current rating of the system decreases as the operating ambient increases. This data can also be used to determine potential local "hot spot" internal to the test sample, possible degradation factors, thermal effects on adjacent areas and/or the acceptability for use of pulsing techniques.

PROCEDURE:

1. The test was performed in accordance with EIA 364, Test Procedure 70

2. The test samples were prepared to accept thermocouples at the appropriate locations.

3. Thermocouple locations:

   a) FWS Series : In the middle of the contact area and length

   b) FWJ Series : Thermocouple #2 - on the right angle bend in the termination portion
   Thermocouple #1 - Same as FWS Series

PROCEDURE: Continued

4. An additional thermocouple was placed 2″ outside of the test samples adjacent to the locations to be monitored. This is accomplished to evaluate the impact of ambient conditions.

5. The thermocouples were attached to a data acquisition/scanner system.

6. The test specimen was placed in a chamber or room which prevents air currents and the like, influencing the observations.

7. Test Conditions:

   a) Current Levels : 5, 10, 15 and 20 amps
   b) No. of Contacts in Series : Five (Middle Contact Monitored)
   c) Derating Curve : Yes

8. The current level indicated was applied until temperature stabilization was reached.

9. Temperature stabilization is defined as no change in T-Rise greater than ± 1°C over a 15 minute interval.

REQUIREMENTS:

The temperature rise shall be measured and recorded and a current derating curve established.

RESULTS:

1. The following is a summary of the data observed:

	TEMPERATURE RISE (°C)			
	5 amps	10 amps	15 amps	20 amps
FWS	8.4	29.7	62.7	106.7
FWJ (Mating Area)	8.1	26.7	55.8	96.1
FWJ (Rt.Angle Area)	6.9	20.4	38.8	65.7

2. Figures #1 thru 3 are the current derating curves for connectors evaluated with maximum operating temperature of 105°C.

FIGURE #1

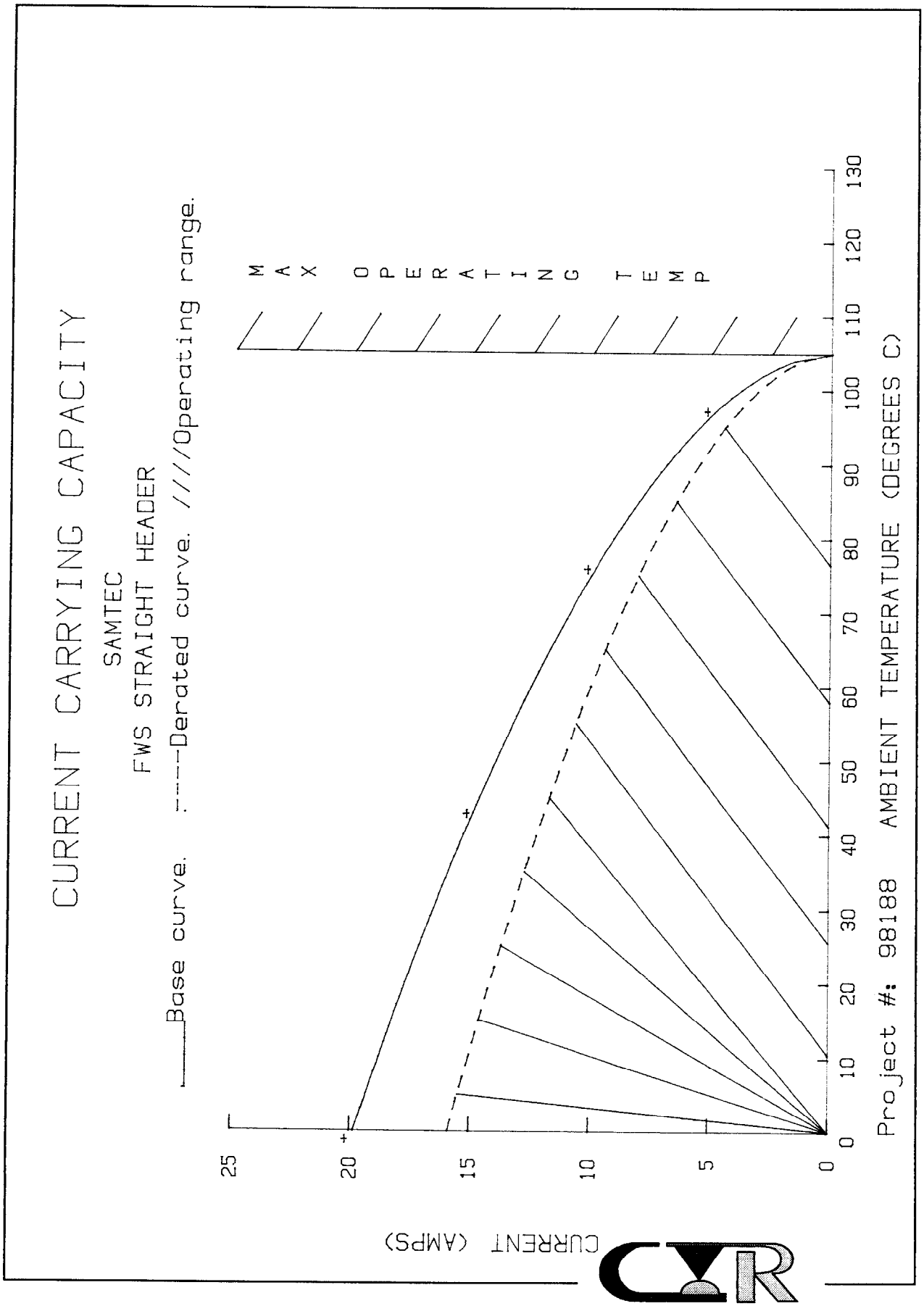

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FIGURE #2

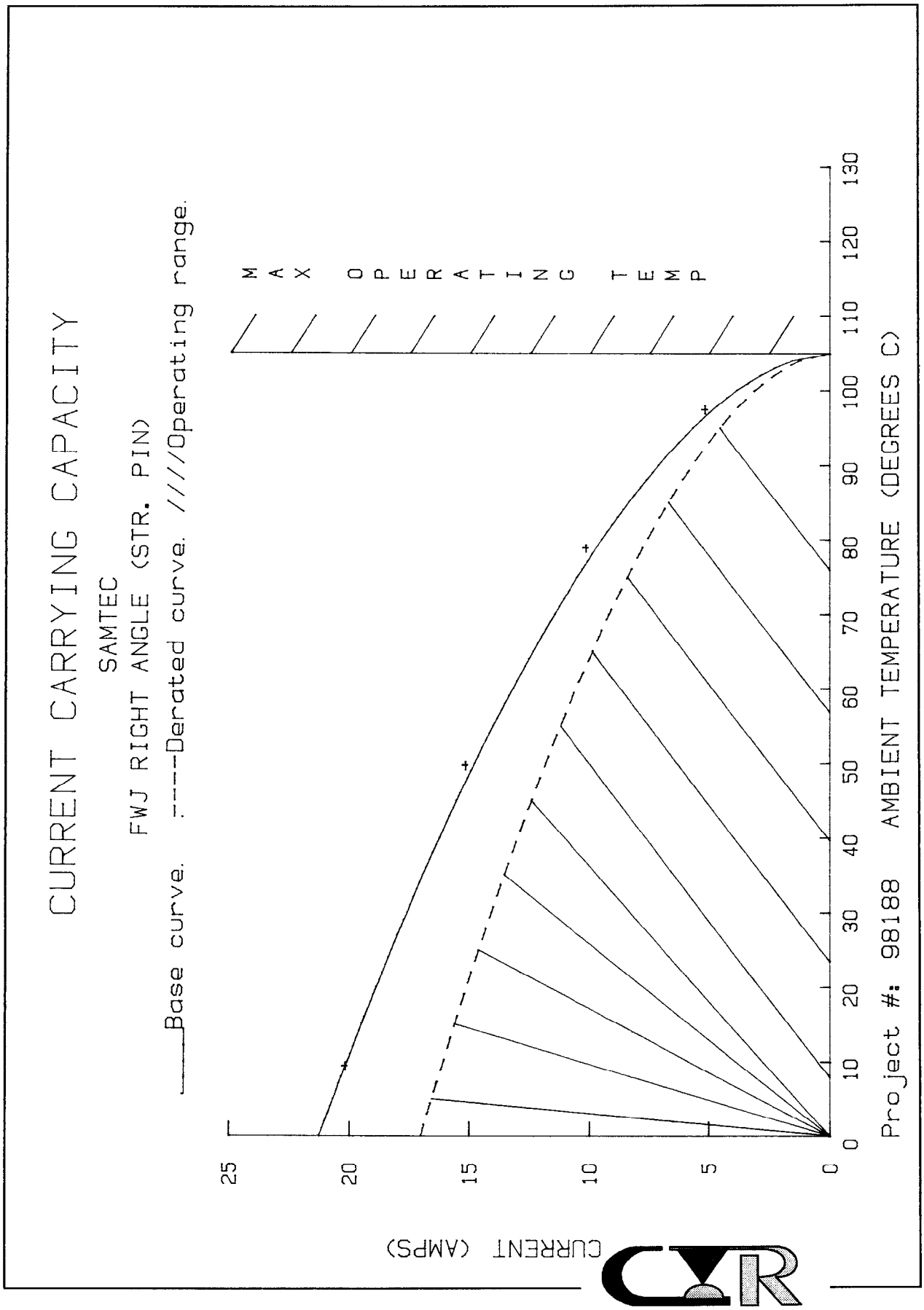

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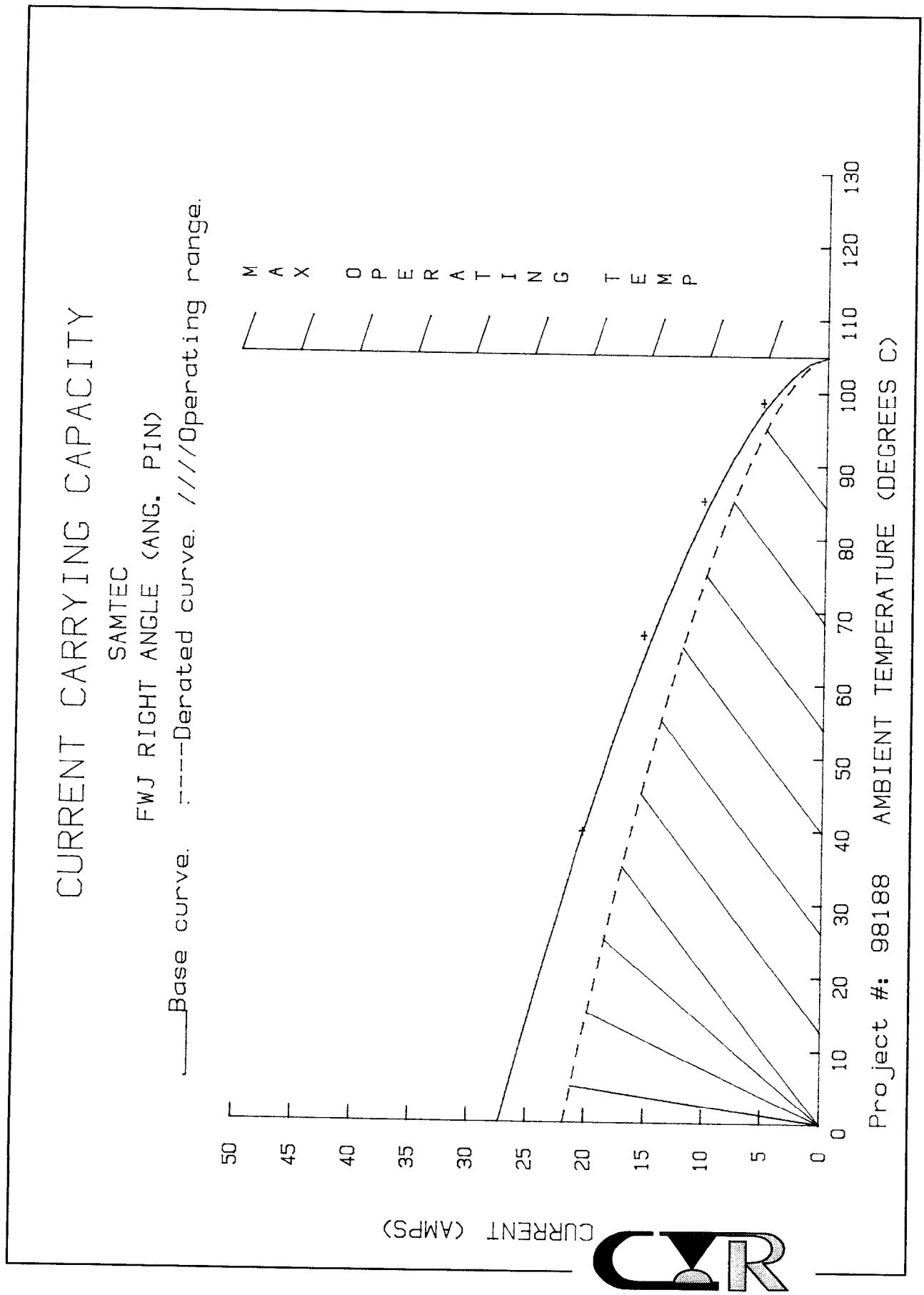
FIGURE #3



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TEMPERATURE RISE TEST

Project #: 98188
Customer: SAMTEC
Product: FWS STRAIGHT HEADER
Description: 5 AMPS
Technician: RVO

Spec:
SubGroup: N/A
File #: 818801.TRD
Thermocouple type : J
Test current: 5.0

Delta values

Temperature Rise Data (C)

CYCLE	Amb	1
1	21.2	+2.8
2	21.3	+4.3
3	21.3	+5.4
4	21.3	+6.2
5	21.3	+6.6
6	21.3	+7.0
7	21.3	+7.3
8	21.3	+7.5
9	21.3	+7.7
10	21.3	+7.8
11	21.3	+7.9
12	21.3	+8.0
13	21.4	+8.0
14	21.4	+8.0
15	21.4	+8.1
16	21.4	+8.1
17	21.4	+8.2
18	21.4	+8.2
19	21.4	+8.3
20	21.4	+8.3
21	21.4	+8.3
22	21.4	+8.3
23	21.3	+8.4
24	21.4	+8.3
25	21.4	+8.4
26	21.4	+8.4
27	21.4	+8.4
28	21.4	+8.4
29	21.4	+8.3
30	21.4	+8.2
31	21.4	+8.3
32	21.4	+8.3
33	21.4	+8.3
34	21.4	+8.4
35	21.4	+8.3
36	21.4	+8.2
37	21.4	+8.4
38	21.4	+8.2
39	21.5	+8.2

TEMPERATURE RISE TEST

Project #: 98188
Customer: SAMTEC
Product: FWS STRAIGHT HEADER
Description: 10 AMPS
Technician: RVO

Spec:
SubGroup: N/A
File #: 818802.TRD
Thermocouple type : J
Test current: 10.0

Delta values

Temperature Rise Data (C)

CYCLE	Amb	1
1	21.5	+13.3
2	21.5	+18.3
3	21.5	+21.7
4	21.5	+23.0
5	21.5	+24.9
6	21.5	+25.6
7	21.5	+26.2
8	21.5	+27.0
9	21.5	+27.2
10	21.6	+27.9
11	21.6	+27.6
12	21.6	+27.8
13	21.6	+28.3
14	21.5	+28.6
15	21.6	+28.3
16	21.6	+28.9
17	21.6	+28.5
18	21.6	+28.7
19	21.6	+28.5
20	21.6	+28.8
21	21.6	+28.6
22	21.6	+28.6
23	21.6	+28.8
24	21.6	+28.8
25	21.6	+29.1
26	21.6	+29.0
27	21.6	+28.6
28	21.6	+28.9
29	21.6	+29.5
30	21.7	+28.8
31	21.6	+28.7
32	21.6	+29.4
33	21.7	+28.8
34	21.7	+28.9
35	21.6	+28.8
36	21.7	+29.1
37	21.6	+28.9
38	21.7	+29.3
39	21.7	+29.0
40	21.7	+29.2

Project #: 98188
Customer : SAMTEC

File:818802.TRD

Temperature Rise Data (C)

CYCLE	Amb	Delta values 1
41	21.7	+28.9
42	21.7	+29.2
43	21.7	+28.8
44	21.7	+29.4
45	21.7	+29.6
46	21.6	+29.7
47	21.7	+29.7
48	21.7	+29.5
49	21.7	+29.0
50	21.7	+29.1
51	21.7	+29.5
52	21.8	+28.7
53	21.7	+29.2
54	21.7	+29.2
55	21.8	+29.1

TEMPERATURE RISE TEST

Project #: 98188
Customer: SAMTEC
Product: FWS STRAIGHT HEADER
Description: 15 AMPS
Technician: RVO

Spec:
SubGroup: N/A
File #: 818803.TRD
Thermocouple type : J
Test current: 15.0

Delta values

CYCLE	Temperature Rise Data (C) Amb	1
1	21.8	+30.3
2	21.7	+41.1
3	21.8	+47.3
4	21.8	+51.9
5	21.7	+53.5
6	21.7	+55.3
7	21.7	+57.3
8	21.8	+57.3
9	21.7	+59.1
10	21.8	+59.6
11	21.7	+59.4
12	21.7	+59.1
13	21.7	+59.3
14	21.6	+59.3
15	21.7	+59.2
16	21.7	+60.3
17	21.7	+61.3
18	21.7	+60.6
19	21.7	+61.6
20	21.8	+59.1
21	21.7	+59.7
22	21.7	+61.9
23	21.7	+59.7
24	21.7	+60.6
25	21.7	+61.0
26	21.6	+61.3
27	21.7	+60.3
28	21.7	+61.1
29	21.7	+61.7
30	21.7	+60.5
31	21.7	+59.7
32	21.8	+61.0
33	21.7	+61.5
34	21.7	+60.2
35	21.8	+59.3
36	21.8	+61.7
37	21.7	+60.9
38	21.7	+61.3
39	21.8	+61.1
40	21.8	+61.9

Project #: 98188 File:818803.TRD
Customer : SAMTEC

Temperature Rise Data (C)

		Delta values
CYCLE	Amb	1
41	21.8	+61.4
42	21.7	+61.9
43	21.7	+60.6
44	21.8	+60.7
45	21.8	+62.3
46	21.6	+61.9
47	21.8	+60.9
48	21.7	+59.9
49	21.7	+62.2
50	21.7	+61.3
51	21.7	+60.8
52	21.6	+60.0
53	21.7	+61.9
54	21.7	+60.9
55	21.8	+60.1
56	21.7	+60.3
57	21.7	+60.1
58	21.7	+60.4
59	21.8	+61.3
60	21.8	+59.7
61	21.7	+59.9
62	21.7	+62.0
63	21.8	+60.0
64	21.8	+62.4
65	21.7	+61.1
66	21.8	+60.1
67	21.7	+61.2
68	21.8	+61.6
69	21.8	+60.3
70	21.7	+61.6
71	21.6	+62.1
72	21.7	+61.0
73	21.8	+61.4
74	21.7	+60.8
75	21.9	+60.7

TEMPERATURE RISE TEST

Project #: 98188
Customer: SAMTEC
Product: FWS STRAIGHT HEADER
Description: 20 AMPS
Technician: RVO

Spec:
SubGroup: N/A
File #: 818804.TRD
Thermocouple type : J
Test current: 20.0

Delta values

Temperature Rise Data (C)

CYCLE	Amb	1
1	21.8	+53.6
2	22.0	+72.0
3	21.8	+83.5
4	21.7	+90.0
5	21.7	+93.2
6	21.8	+94.6
7	21.9	+98.2
8	21.8	+98.1
9	21.8	+99.2
10	21.9	+100.5
11	21.8	+100.8
12	21.9	+98.3
13	21.8	+101.7
14	21.8	+101.9
15	21.7	+104.0
16	21.9	+101.8
17	21.9	+100.7
18	21.8	+101.0
19	21.8	+101.0
20	21.8	+100.5
21	21.7	+104.6
22	21.7	+101.9
23	21.6	+102.6
24	21.6	+102.1
25	21.8	+102.9
26	21.7	+104.5
27	21.9	+104.4
28	21.6	+105.0
29	21.7	+103.8
30	21.7	+105.6
31	21.7	+103.6
32	21.8	+104.3
33	21.9	+103.6
34	21.8	+105.8
35	21.8	+104.5
36	21.7	+106.2
37	21.7	+104.9
38	21.7	+106.5
39	21.7	+105.5
40	22.0	+105.4

Project #: 98188 File:818804.TRD
Customer : SAMTEC

Temperature Rise Data (C)

		Delta values
CYCLE	Amb	1
41	21.8	+105.5
42	21.8	+105.6
43	21.9	+105.3
44	21.7	+106.1
45	22.0	+103.6
46	21.9	+104.0
47	21.8	+106.3
48	21.7	+104.7
49	21.9	+103.2
50	21.9	+104.4
51	21.8	+101.6
52	21.7	+106.7
53	21.9	+103.5
54	21.7	+104.6
55	21.8	+103.5
56	21.7	+103.5
57	21.8	+105.9
58	21.9	+103.4
59	21.9	+104.4
60	21.8	+102.7
61	21.9	+104.5
62	21.9	+103.3
63	21.8	+105.5
64	21.8	+104.5
65	21.9	+102.4
66	21.8	+101.8
67	21.8	+104.1
68	21.8	+105.2

TEMPERATURE RISE TEST

Project #: 98188
Customer: SAMTEC
Product: FWJ RIGHT ANGLE HEADER
Description: 5 AMPS
Technician: RVO

Spec:
SubGroup: N/A
File #: 818805.TRD
Thermocouple type : J
Test current: 5.0

Delta values

Temperature Rise Data (C)

CYCLE	Amb	1	2
1	22.0	+4.5	+3.9
2	21.9	+5.5	+4.8
3	21.9	+6.0	+5.4
4	21.8	+6.5	+5.7
5	21.7	+6.9	+6.0
6	21.8	+7.4	+6.0
7	21.8	+7.4	+6.0
8	21.5	+7.5	+6.4
9	21.7	+7.3	+6.4
10	21.6	+7.8	+6.5
11	21.7	+7.6	+6.3
12	21.6	+7.7	+6.4
13	21.8	+7.5	+6.4
14	21.9	+7.5	+6.4
15	21.8	+8.0	+6.3
16	21.8	+8.0	+6.4
17	21.8	+7.9	+6.5
18	21.7	+8.0	+6.3
19	21.5	+8.0	+6.6
20	21.7	+7.8	+6.5
21	21.7	+7.7	+6.5
22	21.6	+7.8	+6.5
23	21.5	+7.8	+6.7
24	21.4	+7.8	+6.9
25	21.5	+7.8	+6.6
26	21.5	+7.8	+6.7
27	21.5	+7.7	+6.8
28	21.4	+7.9	+6.8
29	21.5	+7.9	+6.7
30	21.6	+7.7	+6.6
31	21.6	+7.7	+6.6
32	21.6	+7.8	+6.6
33	21.7	+7.5	+6.9
34	21.5	+8.0	+6.6
35	21.5	+8.1	+6.6
36	21.7	+7.9	+6.6

TEMPERATURE RISE TEST

Project #: 98188
Customer: SAMTEC
Product: FWJ RIGHT ANGLE HEADER
Description: 10 AMPS
Technician: RVO

Spec:
SubGroup: N/A
File #: 818806.TRD
Thermocouple type : J
Test current: 10.0

Delta values

Temperature Rise Data (C)

CYCLE	Amb	1	2
1	21.9	+11.9	+10.2
2	21.7	+16.6	+13.4
3	21.6	+19.7	+15.3
4	21.6	+21.3	+16.9
5	21.6	+23.0	+17.3
6	21.6	+23.1	+18.0
7	21.6	+23.5	+18.6
8	21.4	+24.2	+19.3
9	21.5	+24.6	+19.2
10	21.5	+24.6	+19.6
11	21.7	+24.7	+19.4
12	21.7	+24.7	+19.7
13	21.6	+26.1	+19.3
14	21.5	+25.7	+19.5
15	21.6	+25.6	+19.5
16	21.6	+25.6	+19.7
17	21.5	+25.6	+19.8
18	21.6	+25.9	+19.5
19	21.5	+25.6	+19.9
20	21.5	+26.1	+19.9
21	21.5	+25.8	+20.1
22	21.5	+26.4	+19.6
23	21.5	+26.0	+19.9
24	21.5	+25.8	+20.0
25	21.5	+25.7	+20.1
26	21.5	+25.8	+20.1
27	21.5	+26.0	+20.1
28	21.5	+26.1	+20.0
29	21.6	+26.2	+19.7
30	21.5	+25.8	+20.4
31	21.5	+26.0	+20.0
32	21.6	+26.4	+19.7
33	21.5	+26.4	+19.8
34	21.6	+26.7	+19.5
35	21.7	+26.0	+19.8
36	21.6	+26.0	+20.0
37	21.6	+26.6	+19.6
38	21.7	+26.5	+19.7
39	21.7	+26.2	+19.6
40	21.6	+26.3	+19.7

Project #: 98188 File:818806.TRD
Customer : SAMTEC

Temperature Rise Data (C)

		Delta values	
CYCLE	Amb	1	2
41	21.6	+25.8	+20.3
42	21.6	+26.4	+19.9
43	21.8	+26.0	+20.4

TEMPERATURE RISE TEST

Project #: 98188
Customer: SAMTEC
Product: FWJ RIGHT ANGLE HEADER
Description: 15 AMPS
Technician: RVO

Spec:
SubGroup: N/A
File #: 818807.TRD
Thermocouple type : J
Test current: 15.0

Delta values

Temperature Rise Data (C)

CYCLE	Amb	1	2
1	21.9	+27.2	+20.8
2	21.8	+37.0	+27.6
3	21.7	+42.4	+31.6
4	21.8	+45.8	+34.2
5	21.8	+49.1	+35.5
6	21.6	+49.7	+36.5
7	21.7	+51.2	+37.1
8	21.9	+51.7	+37.2
9	21.9	+52.0	+37.7
10	21.8	+53.9	+37.3
11	21.8	+52.3	+38.1
12	21.7	+52.3	+38.3
13	21.7	+53.9	+37.8
14	21.7	+54.3	+37.8
15	21.8	+53.9	+38.2
16	21.8	+54.4	+38.3
17	21.8	+54.5	+37.2
18	21.8	+52.4	+38.6
19	21.8	+54.7	+37.7
20	21.7	+54.2	+37.5
21	21.7	+53.5	+37.9
22	21.7	+54.4	+37.4
23	21.7	+52.6	+38.6
24	21.7	+54.0	+38.3
25	21.7	+54.8	+37.6
26	21.6	+54.8	+37.5
27	21.5	+54.5	+38.0
28	21.7	+55.0	+37.8
29	21.5	+54.6	+38.1
30	21.6	+55.1	+38.2
31	21.6	+54.8	+38.2
32	21.7	+53.9	+38.7
33	21.6	+54.4	+37.7
34	21.6	+54.3	+38.1
35	21.8	+54.2	+37.9
36	21.7	+54.9	+37.6
37	21.8	+54.4	+37.9
38	21.8	+54.1	+37.8
39	21.7	+54.3	+38.0
40	21.5	+54.6	+38.1

Project #: 98188 File:818807.TRD
Customer : SAMTEC

Temperature Rise Data (C)

		Delta values	
CYCLE	Amb	1	2
41	21.8	+55.1	+37.6
42	21.8	+54.9	+38.1
43	21.8	+54.8	+38.5
44	21.7	+54.0	+38.6
45	21.7	+54.8	+38.0
46	21.8	+54.7	+37.7
47	21.8	+54.9	+37.6
48	21.7	+55.0	+37.6
49	21.8	+54.2	+38.4
50	21.8	+55.0	+37.6
51	21.7	+55.2	+37.5
52	21.8	+55.8	+36.5
53	21.8	+54.6	+37.6
54	21.8	+54.4	+38.0
55	21.6	+54.9	+37.4
56	21.7	+54.3	+38.1
57	21.7	+55.0	+38.4
58	21.6	+55.1	+38.8

TEMPERATURE RISE TEST

Project #: 98188
Customer: SAMTEC
Product: FWJ RIGHT ANGLE HEADER
Description: 20 AMPS
Technician: RVO

Spec:
SubGroup: N/A
File #: 818808.TRD
Thermocouple type : J
Test current: 20.0

Delta values

Temperature Rise Data (C)

CYCLE	Amb	1	2
1	22.0	+47.0	+34.5
2	22.0	+62.8	+46.5
3	21.9	+74.0	+52.7
4	21.9	+80.2	+56.8
5	22.0	+83.2	+58.9
6	21.8	+85.5	+61.0
7	21.8	+88.4	+61.8
8	21.7	+88.7	+62.8
9	21.9	+92.4	+61.6
10	21.9	+91.6	+63.4
11	21.9	+90.6	+63.9
12	21.9	+91.4	+64.2
13	21.9	+92.4	+63.6
14	21.9	+91.6	+65.2
15	21.9	+93.0	+64.0
16	21.8	+93.1	+63.1
17	21.9	+92.7	+64.4
18	22.0	+93.2	+64.4
19	22.0	+92.5	+64.3
20	22.0	+92.2	+64.9
21	22.0	+93.9	+63.5
22	21.8	+94.1	+63.5
23	21.9	+94.2	+63.4
24	22.0	+94.0	+63.7
25	21.9	+93.8	+63.4
26	22.1	+94.5	+62.6
27	22.0	+94.4	+62.9
28	21.9	+94.5	+63.1
29	22.1	+93.9	+63.2
30	22.2	+93.7	+63.5
31	22.0	+93.4	+63.1
32	22.0	+93.2	+64.1
33	22.0	+92.7	+63.2
34	21.9	+93.9	+63.1
35	22.0	+94.2	+63.2
36	21.9	+94.5	+63.7
37	22.0	+93.2	+64.7
38	22.0	+94.4	+63.4
39	22.0	+93.5	+64.5
40	21.8	+93.2	+64.6

Project #: 98188 File:818808.TRD
Customer : SAMTEC

Temperature Rise Data (C)

CYCLE	Amb	Delta values 1	2
41	21.8	+95.3	+63.1
42	21.8	+93.2	+64.3
43	21.6	+94.0	+65.2
44	21.8	+96.0	+63.2
45	21.9	+95.2	+64.6
46	21.9	+95.1	+63.9
47	22.0	+93.3	+65.7
48	21.9	+95.2	+64.4
49	22.1	+94.7	+64.9
50	22.0	+94.6	+65.3
51	22.1	+94.0	+65.4
52	22.1	+94.5	+64.0
53	22.0	+93.7	+63.9
54	22.1	+93.8	+64.5
55	22.1	+94.7	+64.6
56	22.2	+94.0	+64.6
57	22.1	+94.4	+64.7
58	22.0	+92.9	+64.7
59	22.0	+96.0	+62.3
60	22.0	+95.1	+64.4
61	22.1	+94.0	+64.3
62	21.9	+95.2	+64.8
63	22.0	+95.4	+64.5
64	21.9	+94.6	+63.9
65	22.0	+94.7	+64.7
66	22.2	+95.3	+63.7
67	22.1	+93.6	+65.1
68	22.0	+94.9	+64.9
69	22.0	+95.3	+64.3
70	22.1	+95.8	+63.9
71	22.0	+95.8	+64.0
72	22.0	+96.1	+63.4
73	22.0	+95.7	+64.3
74	22.1	+95.6	+64.1