308 --- Q200604250005
Scientific Notebook No 712: Alloy 22 Repassivation Test (05/03/2005 through 07/27/2005)

LABORATORY NOTEBOOK

CNWRA/SwRI

NOTEBOOK NO. 712
ISSUED TO DARRELL DUNN DD
ON 5/03 20 05
DEPARTMENT 20
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CNWRA
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COPY 712

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Initial Scientific notebook entry for crevice corrosion repassivation potential measurements

Title: Alloy 22 Repassivation Tests

Tests Preformed by: Darrell S. Dunn, Yi-Ming Pan Div 20; Brian Derby, Div. 18. Steve Young. Div 18

Objectives: Measure Crevice Corrosion Repassivation Potentials for Alloy 22 as a function of solution chemistry, temperature and metallurgical condition

Equipment:. Keithley 614/617. Potentiostat (Solartron 1287/1480, EG&G 273, PAR 263 or equivalent) and CorrView Software or equivalent, Electrochemical test cell.

Laboratory oven for exposure of test specimens at 600 to 900 °C, Thermocouple and thermocouple meter for thermally aged specimens

Laboratory oven for exposure of test specimens at 1100 to 1350 °C, Thermocouple and thermocouple meter for solution annealed specimens

Materials: Alloy C-22, heat to be identified in each test. Other materials and heats to be added and identified prior to testing.

Specimen specifications: Specimens will be equivalent to 20-06002-01-322-002 or 20-01402-571-027 or a similar crevice corrosion specimen unless otherwise specified.

Measurement Parameters: Potential and Current of specimen during test. Temperature and time of exposure for thermally aged or heat treated specimens.

Required level of accuracy: Temperature ± 5 °C, Time of exposure ± 1 minute, Potentials ± 1mV, Current ± 0.1 microamp.

Uncertainty and Sources of Error: Current measurement error can occur for localized corrosion processes because the actively corroding area is not the same as the surface area of the test specimen.

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-3266 # 20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 39.62048 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 39.51487 g **Cal:** 11/10/04 **Due:** 5/10/05

Solution: 5M $MgCl_2$ (10M Cl)
2033.10g $MgCl_2 \cdot 6H_2O$ Lot: 044975
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 3.41 **Model:** Orion EA 940 **SN:** 2330
Final pH: 4.93 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 105° C **Measured with Hg Thermometer** **SN:** 323007 **Cal:** 10/14/04 **Due:** 10/14/2005

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: -385 mV_{SCE} **Model:** Keithley 614 **SN:** 467374
Ept: +419 mV_{SCE} **Cal:** 12/2/04 **Due:** 12/2/2005

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C-22 Trap 41a

Number of Crevice Corrosion Sites: 24/24 (24 max.)

Mild staining on all surfaces.
Corrosion developes from outer edges of crevice washers.

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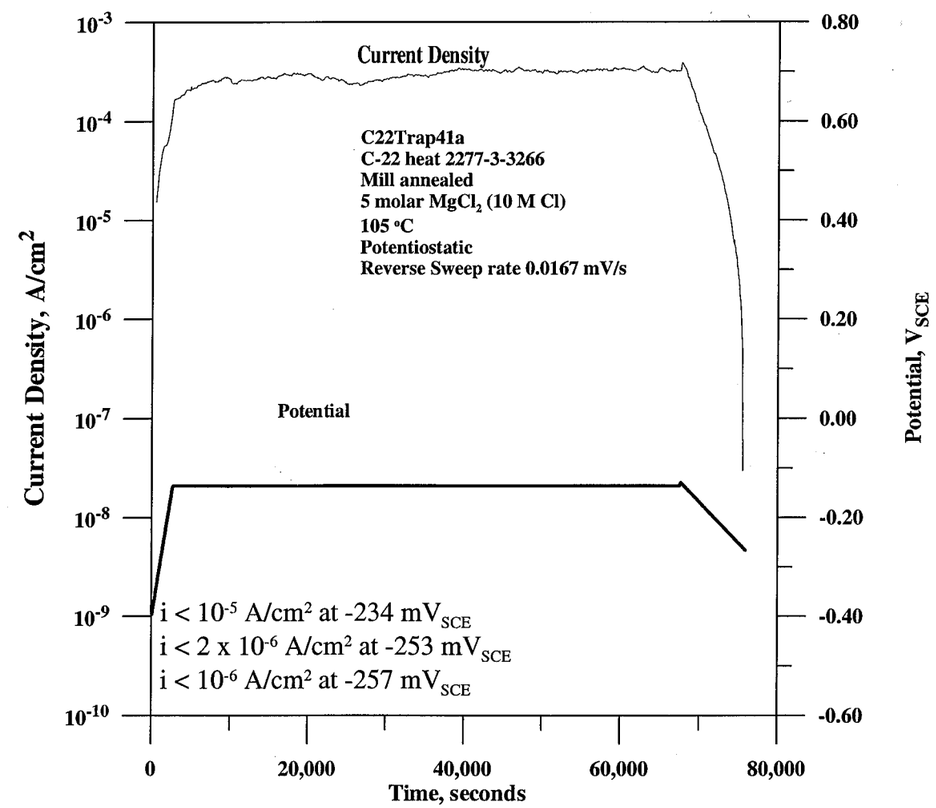

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-3266 # 20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 39.81107 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 39.73458 g **Cal:** 11/10/04 **Due:** 5/10/05

Solution: 5M $MgCl_2$ (10M Cl)
2033.14g $MgCl_2 \cdot 6H_2O$ Lot: 044975
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 2.17 **Model:** Orion EA 940 **SN:** 2330
Final pH: 4.93 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 105° C **Measured with Hg Thermometer** **SN:** E98-191 **Cal:** 01/07/05 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: −407 mV_{SCE} **Model:** Keithley 614 **SN:** 467374
Ept: +432 mV_{SCE} **Cal:** 12/2/04 **Due:** 12/2/2005

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C-22 Trap 41b

Number of Crevice Corrosion Sites: 24 /24 (24 max.)

Mild staining on all surfaces.
Corrosion developes from outer edges of crevice washers.

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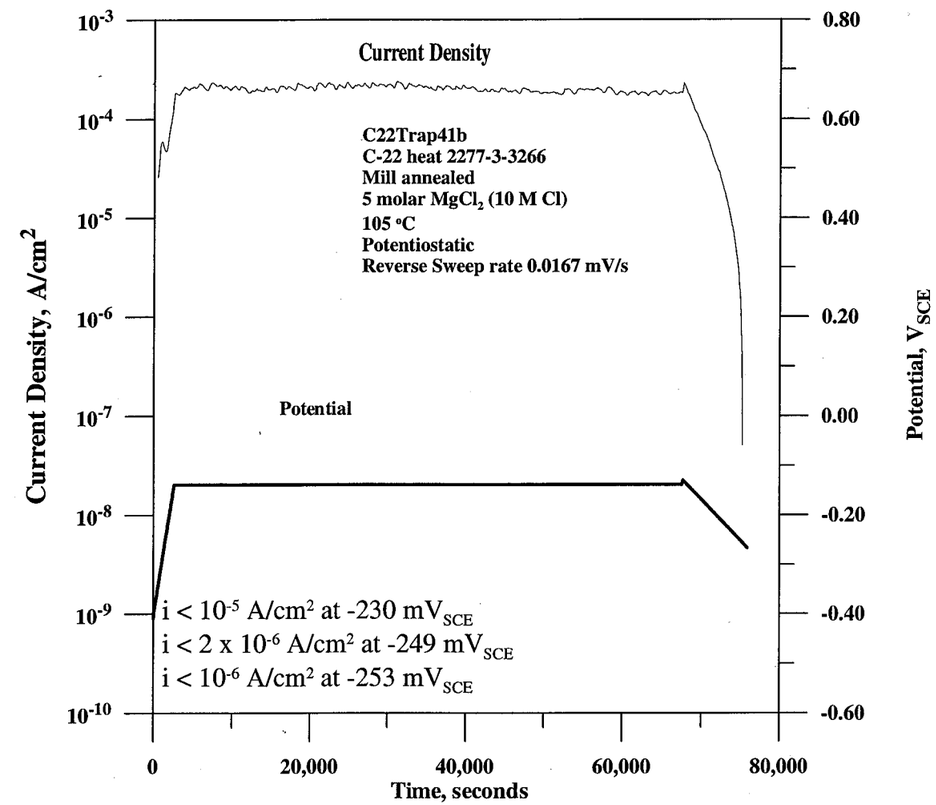

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-3266 # 20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 40.03479 g **Final Weight:** 39.71244 g	**Model:** Sartorius Genius **Cal:** 11/10/04	**SN:** 12809099 **Due:** 5/10/05
Solution: 5M NaCl 584.40g NaCl Lot: 037047A + DI to 2L		
Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 8.76 **Final pH:** 6.99	**Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 105 °C	**Measured with Hg Thermometer** **Cal:** 10/14/04	**SN:** 323007 **Due:** 10/14/2005
Counter Electrode: Platinum Flag		
Reference Electrode: Fisher 13-620-52		**SN:** 4028036
Gas: 99.999% Nitrogen Gas		
Ecorr: −390 mV$_{SCE}$ **Ept:** +140 mV$_{SCE}$	**Model:** Keithley 614 **Cal:** 12/2/04	**SN:** 467374 **Due:** 12/2/2005
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C-22 Trap 42a

Number of Crevice Corrosion Sites: 24 /24 (24 max.)

Corrosion developes from outer edges of crevice washers.
Mild staining on all surfaces.

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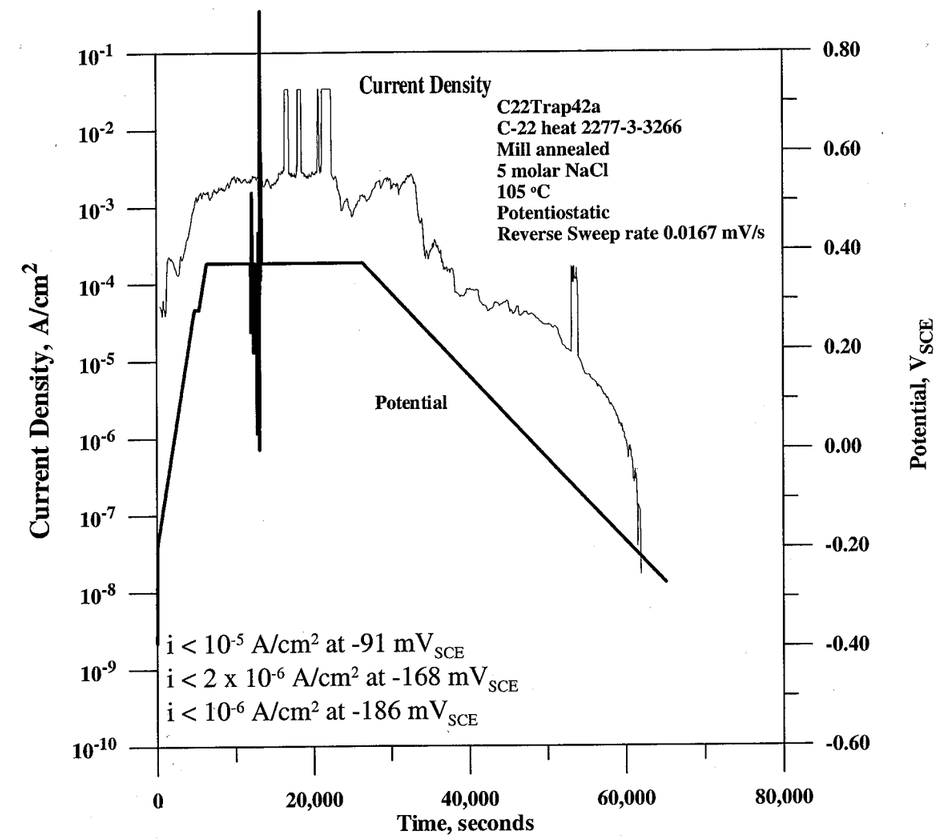

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-3266 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 40.53833g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 40.17600g **Cal:** 11/10/04 **Due:** 5/10/05

Solution: 5M NaCl
584.40g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883
Cal: 1/14/05 **Due:** 7/14/05

Initial pH: 7.62 **Model:** Orion EA 940 **SN:** 2330
Final pH: 6.92 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 105° C **Measured with Hg Thermometer** **SN:** E98-191
Cal: 01/07/05 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: −430 mV_{SCE} **Model:** Keithley 614 **SN:** 467374
Ept: −25 mV_{SCE} **Cal:** 12/2/04 **Due:** 12/2/2005

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C-22 Trap 42b

Number of Crevice Corrosion Sites: 24 /24 (24 max.)

Corrosions developes from outer edges
of crevice washers.
Mild staining on all surfaces.

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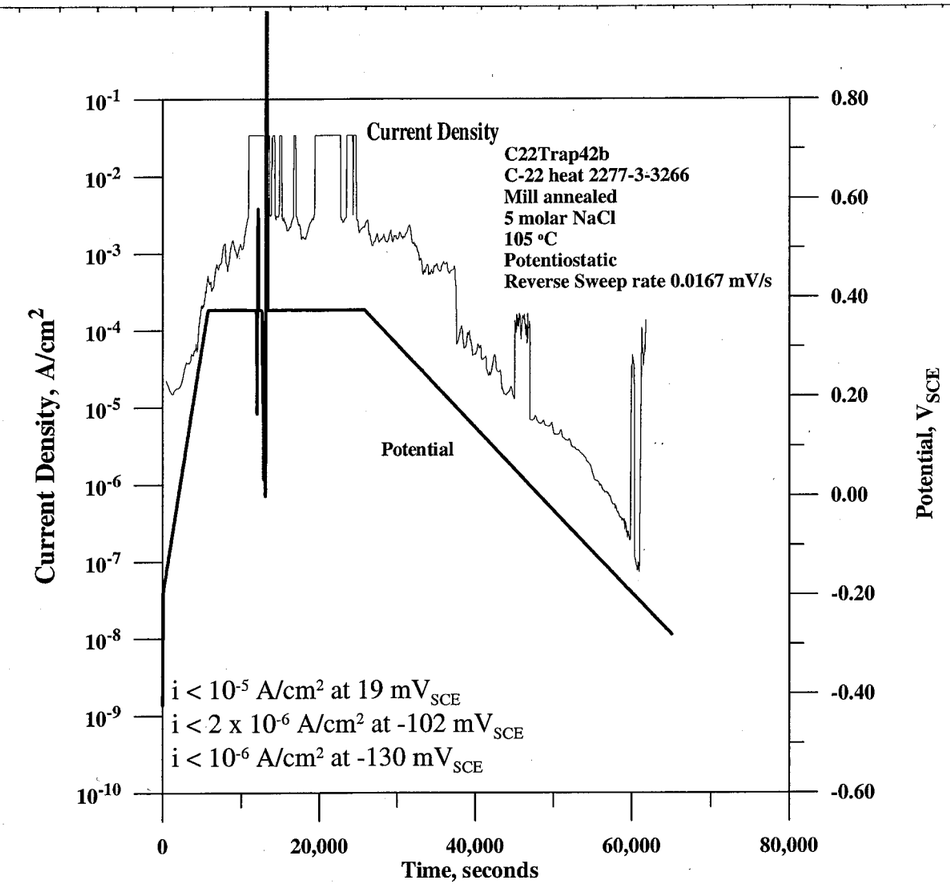

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Test matrix for measuring crevice corrosion repassivation potentials for GTAW Alloy 22 welds in chloride solutions

95°C – N_2

Test No.	Material Condition	Chloride Concentration (M)	Test ID
1	as-welded	0.001	1T
2	as-welded	0.001	2T
3	as-welded	0.01	1M
4	as-welded	0.01	2M
5	as-welded	0.1	1B
6	as-welded	0.1	2B
7	as-welded	0.5	3T
8	as-welded	0.5	4T
9	as-welded	1.0	3M
10	as-welded	1.0	4M
11	as-welded	4.0	3B
12	as-welded	4.0	4B
13	weld+1125°C/20min	0.001	5T
14	weld+1125°C/20min	0.001	6T
15	weld+1125°C/20min	0.01	5M
16	weld+1125°C/20min	0.01	6M
17	weld+1125°C/20min	0.1	5B
18	weld+1125°C/20min	0.1	6B
19	weld+1125°C/20min	0.5	7T
20	weld+1125°C/20min	0.5	8T
21	weld+1125°C/20min	1.0	7M
22	weld+1125°C/20min	1.0	8M
23	weld+1125°C/20min	4.0	7B
24	weld+1125°C/20min	4.0	8B

As-welded

BKD 6/1/05

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Test No.	Material Condition	Chloride Concentration (M)	Test ID
25	weld+1125°C/20min	0.001	9T
26	weld+1125°C/20min	0.001	10T
27	weld+1125°C/20min	0.01	9M
28	weld+1125°C/20min	0.01	10M
29	weld+1125°C/20min	0.1	9B
30	weld+1125°C/20min	0.1	10B
31	weld+1125°C/20min	0.5	11T
32	weld+1125°C/20min	0.5	12T
33	weld+1125°C/20min	1.0	11M
34	weld+1125°C/20min	1.0	12M
35	weld+1125°C/20min	4.0	11B
36	weld+1125°C/20min	4.0	12B

All Test 95°C
Bubbled with 99.999% N_2

See Notebook #636
Pg #24 for Weld Material

Pg #57 for Machining

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 10/4/05 BLD

#20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing.* Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 22.80760g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 22.80659g **Cal:** 11/10/04 **Due:** 5/10/05

Solution: 0.001M NaCl
0.117g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.98 **Model:** Orion EA 940 **SN:** 2330
Final pH: 7.76 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** E98-191 **Cal:** 01/07/05 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: - 144mV$_{SCE}$ **Model:** Keithley 614 **SN:** 467374
Ept: + 109mV$_{SCE}$ **Cal:** 12/2/04 **Due:** 12/2/2005

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_1T

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Light staining only.

* Repolish for further testing.

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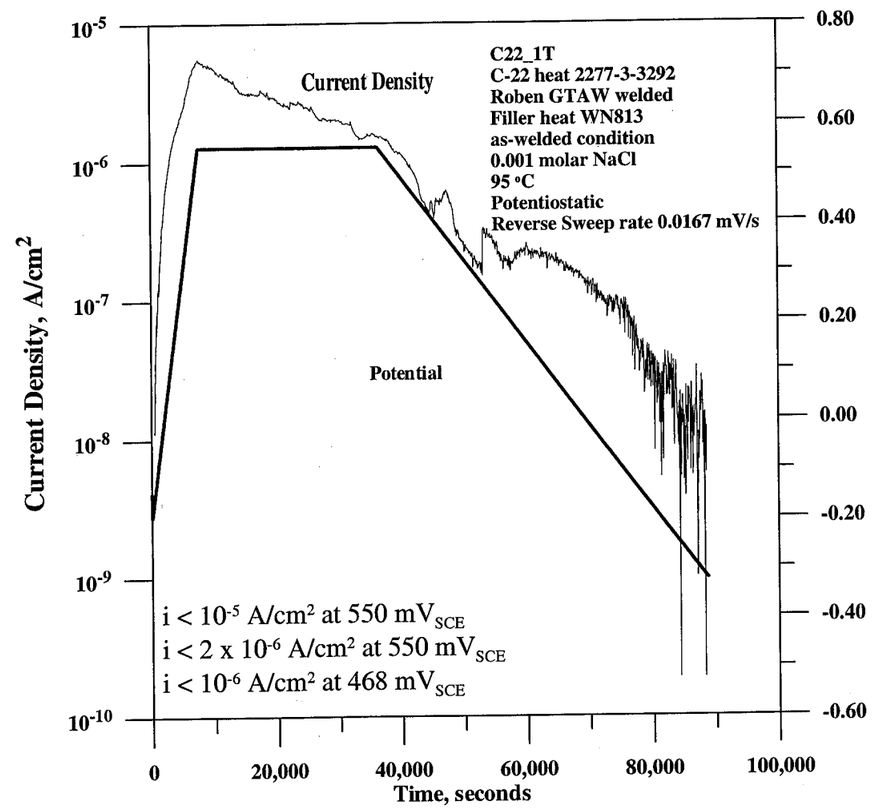

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 10/4/5 58Y #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 22.35687 g **Final Weight:** 22.35617 g	**Model:** Sartorius Genius **Cal:** 11/10/04	**SN:** 12809099 **Due:** 5/10/05
Solution: 0.001M NaCl 0.117g NaCl Lot: 050089 + DI to 2L		
Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 5.80 **Final pH:** 7.72	**Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 95° C	**Measured with Hg Thermometer** **Cal:** 10/14/04	**SN:** 323007 **Due:** 10/14/2005
Counter Electrode: Platinum Flag		
Reference Electrode: Fisher 13-620-52		**SN:** 4028036
Gas: 99.999% Nitrogen Gas		
Ecorr: - 245 mV_{SCE} **Ept:** + 148 mV_{SCE}	**Model:** Keithley 614 **Cal:** 12/2/04	**SN:** 467374 **Due:** 12/2/2005
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_2T

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Light staining only.
* Repolish for further testing.

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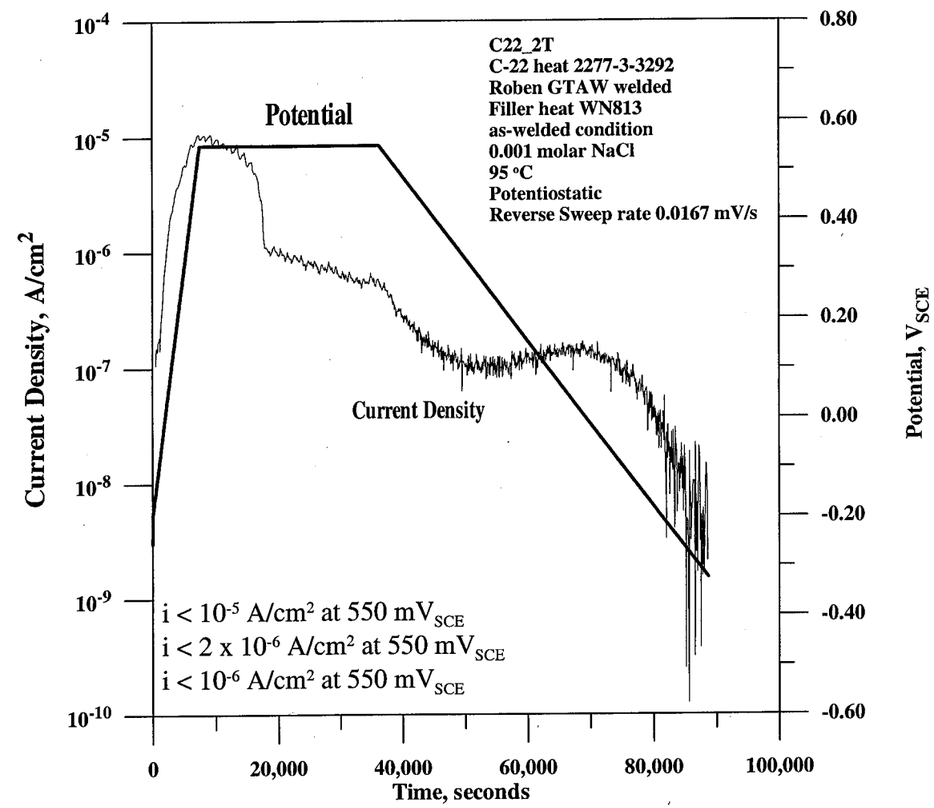

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 10/4/5 SBY

#20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 22.84928g **Final Weight:** 22.84826g **Model:** Sartorius Genius **Cal:** 5/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 0.01M NaCl
1.166g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 6.00 **Final pH:** 7.31 **Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 10/14/04 **SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: -531 mV$_{SCE}$ **Ept:** -054 mV$_{SCE}$ **Model:** Keithley 614 **Cal:** 12/2/04 **SN:** 467374 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_1M

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Light staining only.
* Repolish for further testing.

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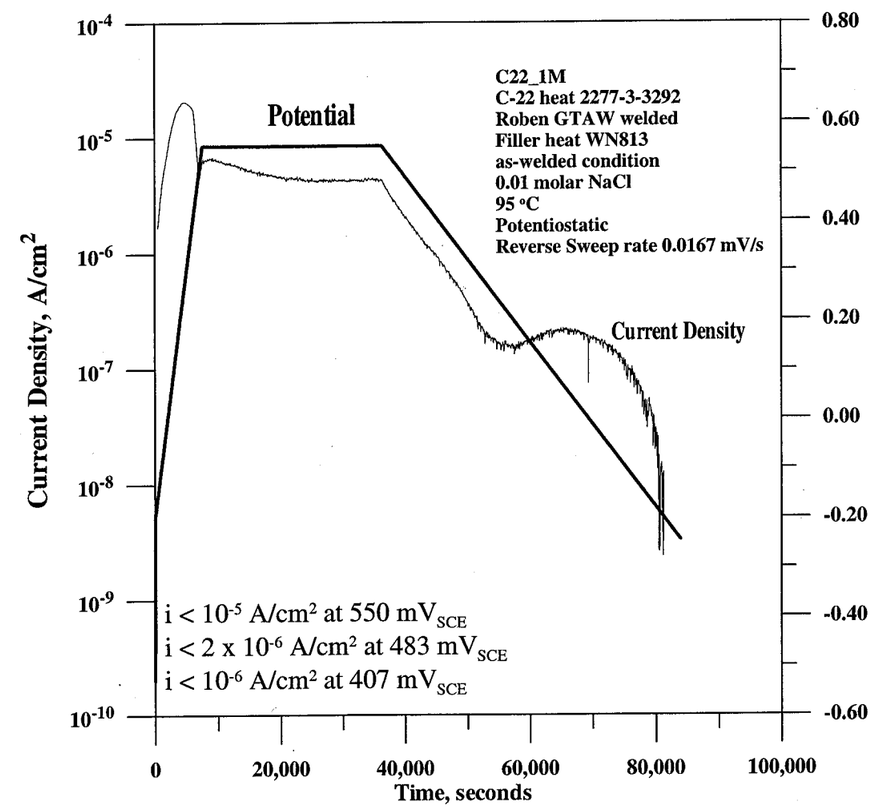

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/4/5 #20.06002.01.322.~~02~~ .002 SBY 4/17/06

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 21.22841 g **Final Weight:** 21.22748 g **Model:** Sartorius Genius **Cal:** 05/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 0.01M NaCl
1.169g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 6.00 **Final pH:** 7.80 **Model:** Orion EA 940 **Cal:7/21/04** **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95° **Measured with Hg Thermometer** **Cal:** 01/07/05 **SN:** E98-191 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: -553 mV$_{SCE}$ **Ept:** +031 mV$_{SCE}$ **Model:** Keithley 614 **Cal:** 12/2/04 **SN:** 467374 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_2M

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Light staining only.

* Repolish for further testing.

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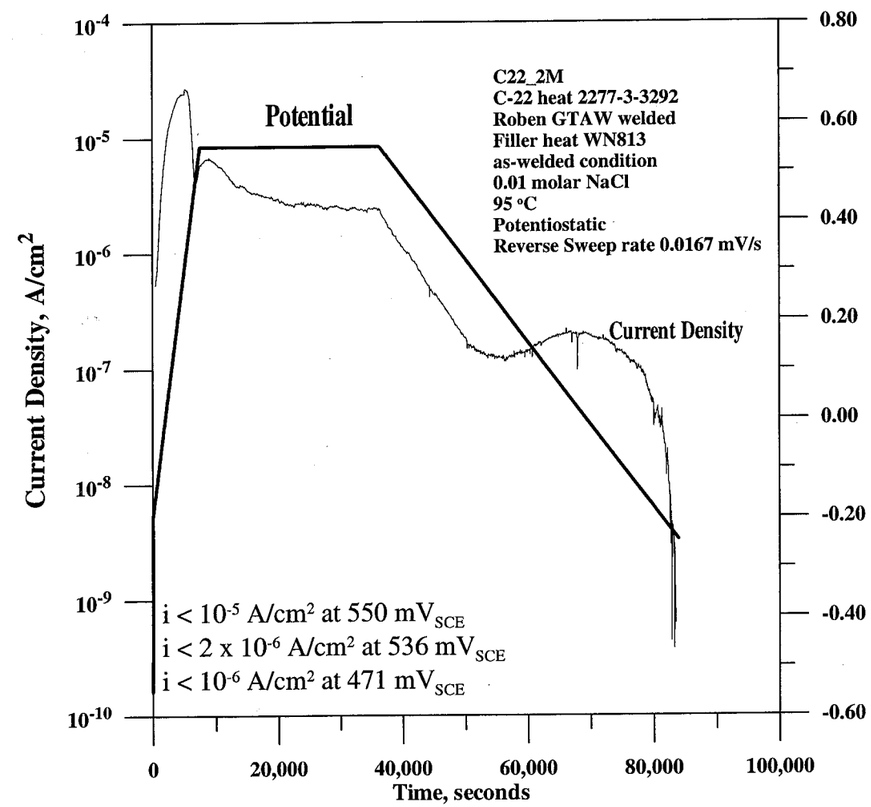

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		Recorded by Steve Young	5/16/05

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3260~~ 3292 SBY 10/4/5 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.21187 g **Final Weight:** 23.20966 g **Model:** Sartorius Genius **Cal:** 5/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 0.1M NaCl
11.689 g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.96 **Final pH:** 7.53 **Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 10/14/04 **SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −555 mV_{SCE} **Ept:** −294 mV_{SCE} **Model:** Keithley 614 **Cal:** 12/2/04 **SN:** 467374 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_1B

Number of Crevice Corrosion Sites: 0/24 (24 max.)

No corrosion sites.
Mild staining.

* Repolish for further testing.

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Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by Steve Young	5/18/05

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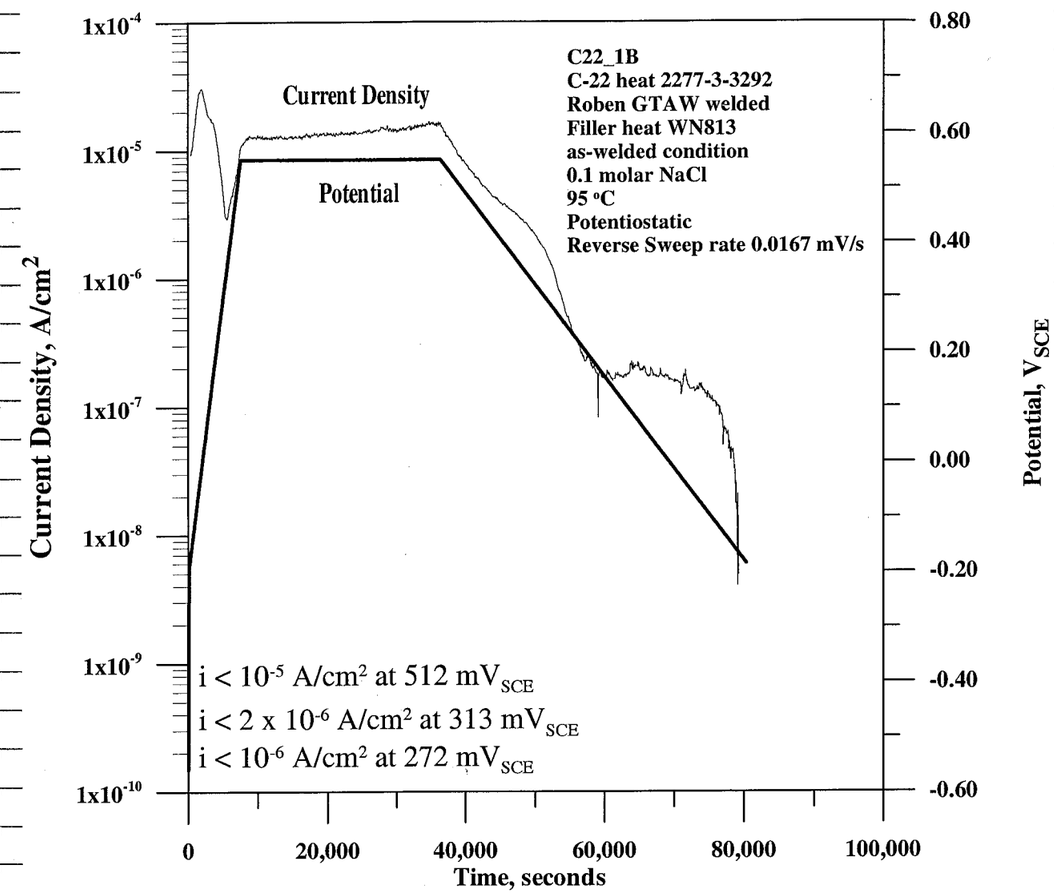

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/4/5 # 20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 23.68624g **Final Weight:** 23.68302g	**Model:** Sartorius Genius **Cal:** 05/11/05	**SN:** 12809099 **Due:** 11/11/05
Solution: 0.1M NaCl 11.687g NaCl Lot: 050089 + DI to 2L		
Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 5.93 **Final pH:** 9.49	**Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 95° C	**Measured with Hg Thermometer** **Cal:** 01/07/05	**SN:** E98-191 **Due:** 07/07/05
Counter Electrode: Platinum Flag		
Reference Electrode: Fisher 13-620-51		**SN:** 7282317
Gas: 99.999% Nitrogen Gas		
Ecorr: −347 mV$_{SCE}$ **Ept:** +47 mV$_{SCE}$	**Model:** Keithley 614 **Cal:** 12/2/04	**SN:** 467374 **Due:** 12/2/05
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_2B

Number of Crevice Corrosion Sites: 1 /24 (24 max.)

One crevice corrosion site.
Mild staining.

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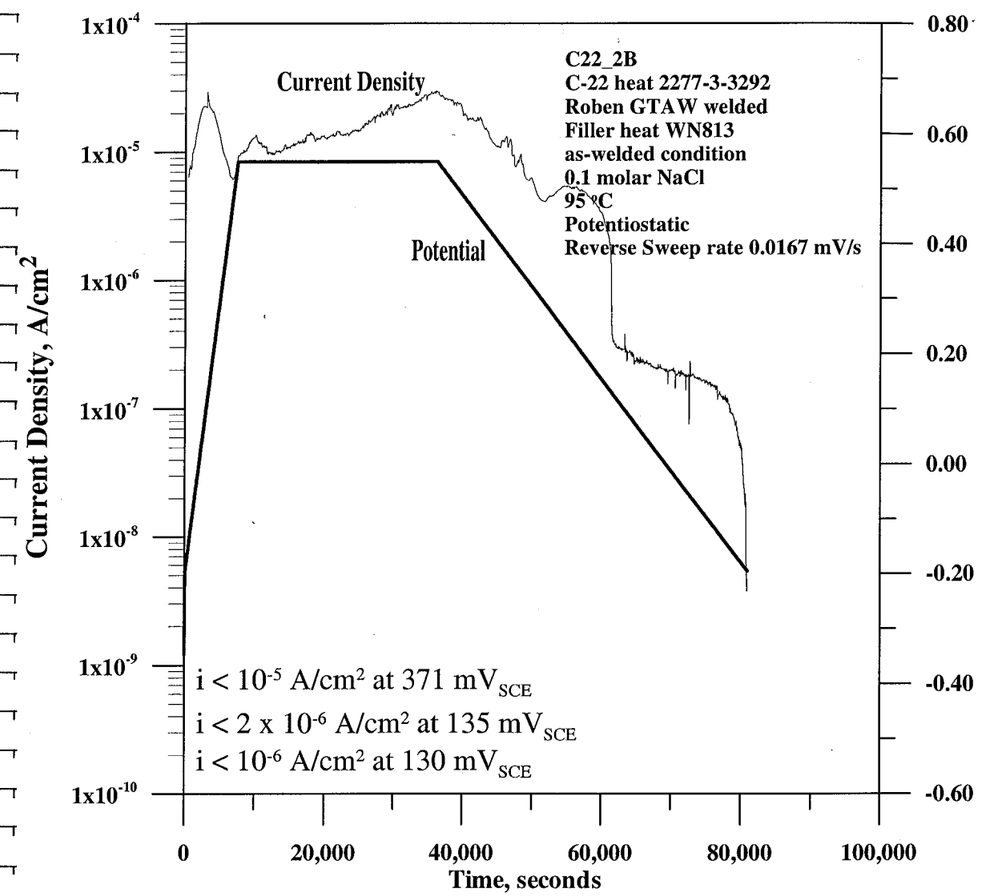

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		Recorded by Steve Young	5/18/05

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/4/5 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.92762g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 23.90750g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 0.5M NaCl
58.43g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.73 **Model:** Orion EA 940 **SN:** 2330
Final pH: 8.14 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** 323007
Cal: 10/14/04 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −438 mV$_{SCE}$ **Model:** Keithley 614 **SN:** 467374
Ept: −416 mV$_{SCE}$ **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_3T

Number of Crevice Corrosion Sites: 1 /24 (24 max.)

One corrosion site.
Mild staining.

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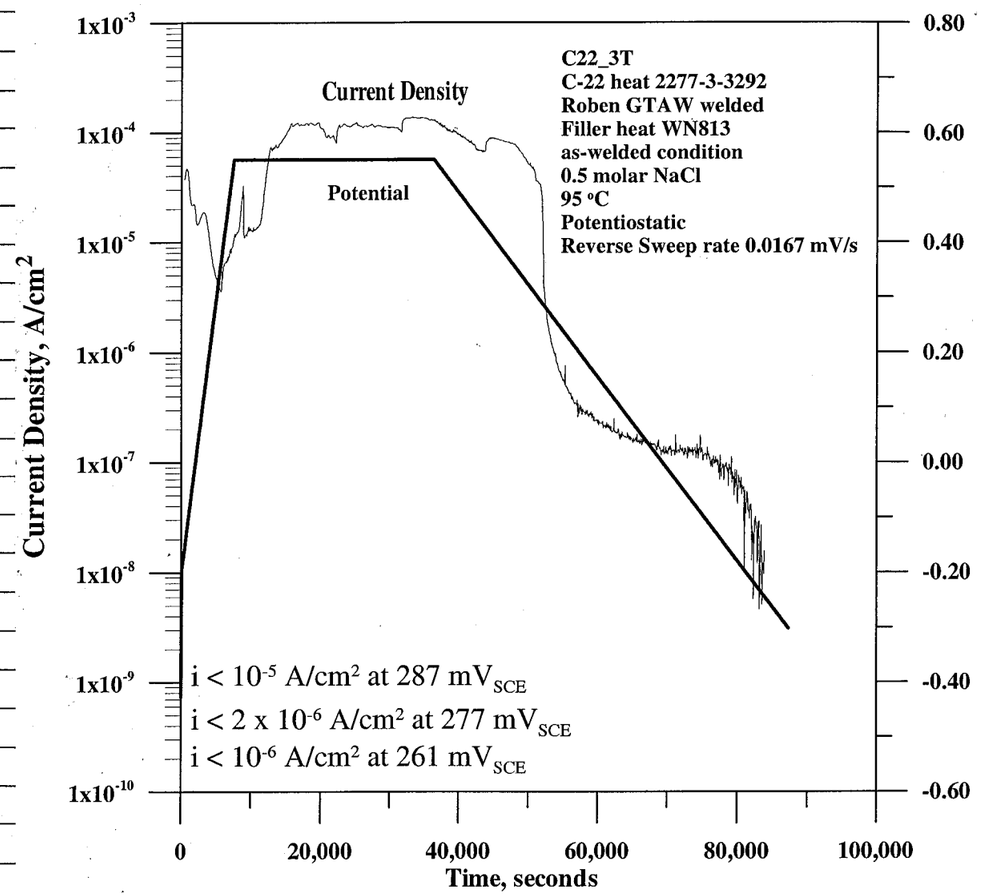

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/4/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.99710g **Final Weight:** 23.99497g **Model:** Sartorius Genius **Cal:** 05/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 0.5M NaCl
58.46g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.89 **Final pH:** 8.04 **Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 01/07/05 **SN:** E98-191 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: −450 mV$_{SCE}$ **Ept:** −416 mV$_{SCE}$ **Model:** Keithley 614 **Cal:** 12/2/04 **SN:** 467374 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_4T

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

Light staining only.

* Repolish for further testing.

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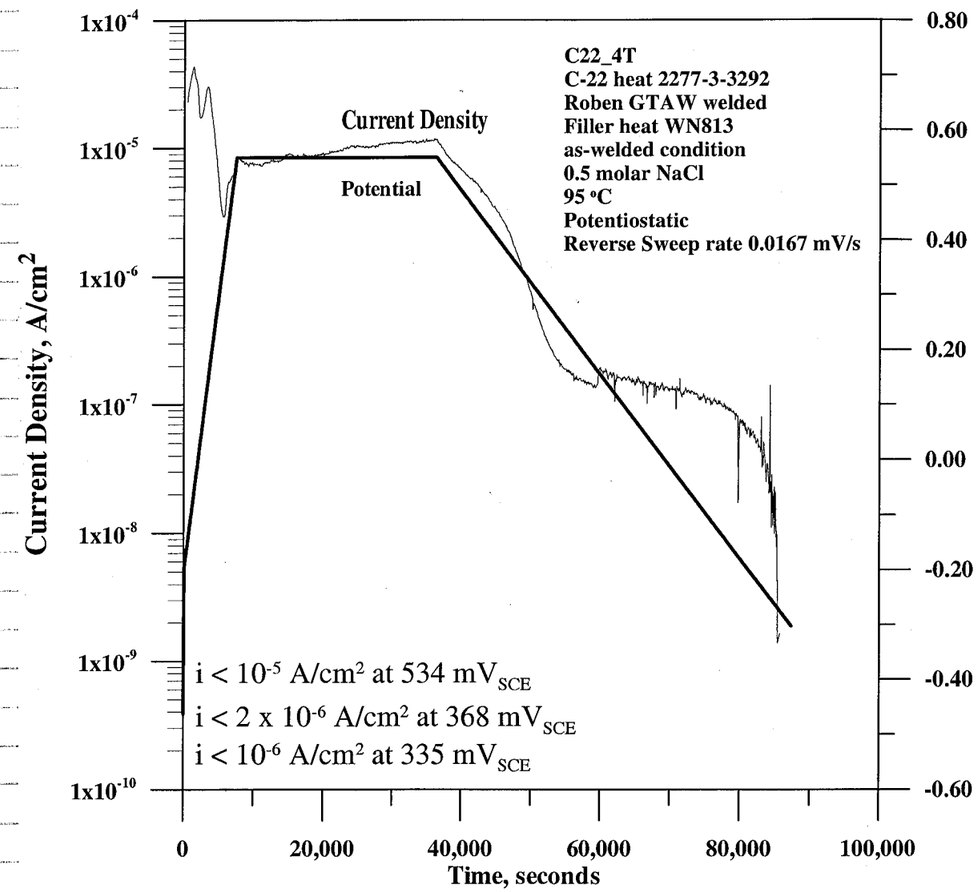

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3200~~ 3292 SBY 10/4/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 23.61111 g **Final Weight:** 23.56927 g	**Model:** Sartorius Genius **Cal:** 5/11/05	**SN:** 12809099 **Due:** 11/11/05

Solution: 1.0M NaCl
116.88g NaCl Lot: 050089
+ DI to 2L

Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 5.59 **Final pH:** 7.71	**Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 95°C	**Measured with Hg Thermometer** **Cal:** 10/14/04	**SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −456 mVSCE **Ept:** −488 mVSCE	**Model:** Keithley 614 **Cal:** 12/2/04	**SN:** 467374 **Due:** 12/2/05
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_3M

Number of Crevice Corrosion Sites: 2 /24 (24 max.)

Two crevice corrosion sites.
Mild surface staining.

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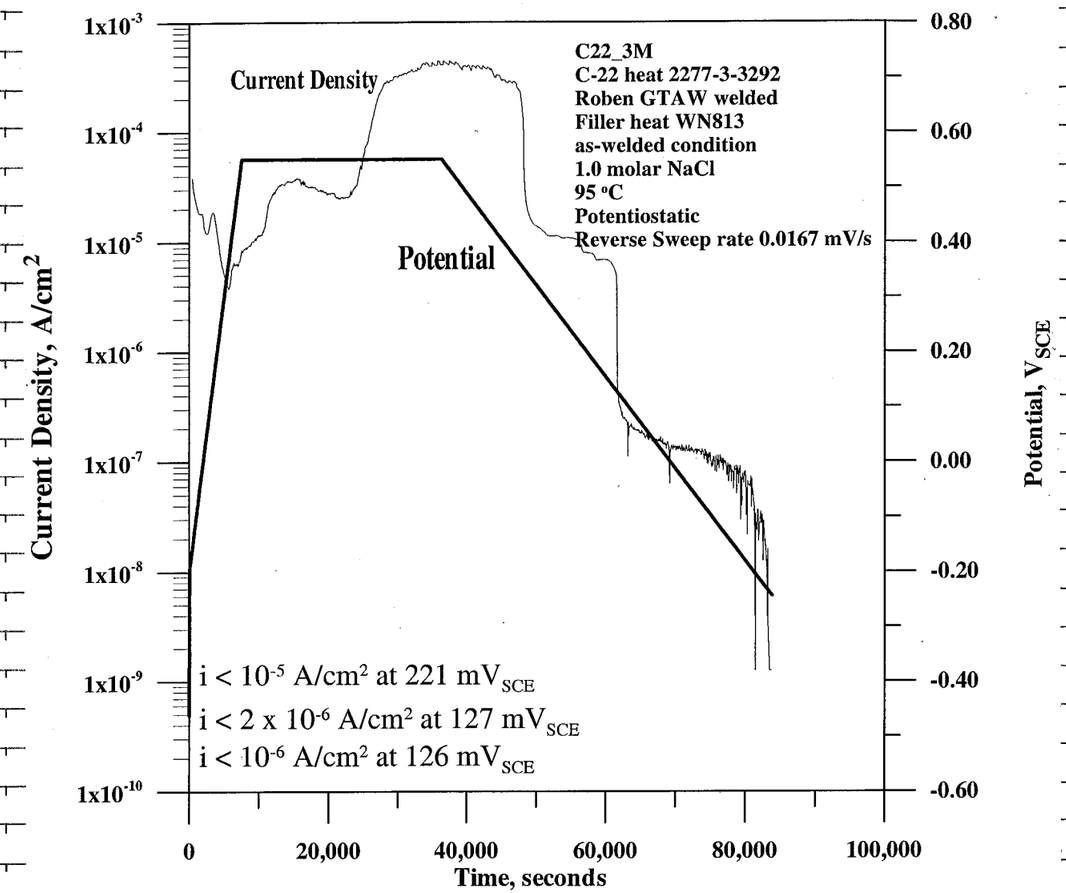

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/4/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.97302g **Final Weight:** 23.85893g **Model:** Sartorius Genius **Cal:** 05/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 1.0M NaCl
116.88g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.98 **Final pH:** 7.80 **Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 01/07/05 **SN:** E98-191 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: -547 mV$_{SCE}$ **Ept:** -478 mV$_{SCE}$ **Model:** Keithley 614 **Cal:** 12/2/04 **SN:** 467374 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_4M

Number of Crevice Corrosion Sites: 6 /24 (24 max.)

Six crevice corrosion sites.
Mild surface staining.

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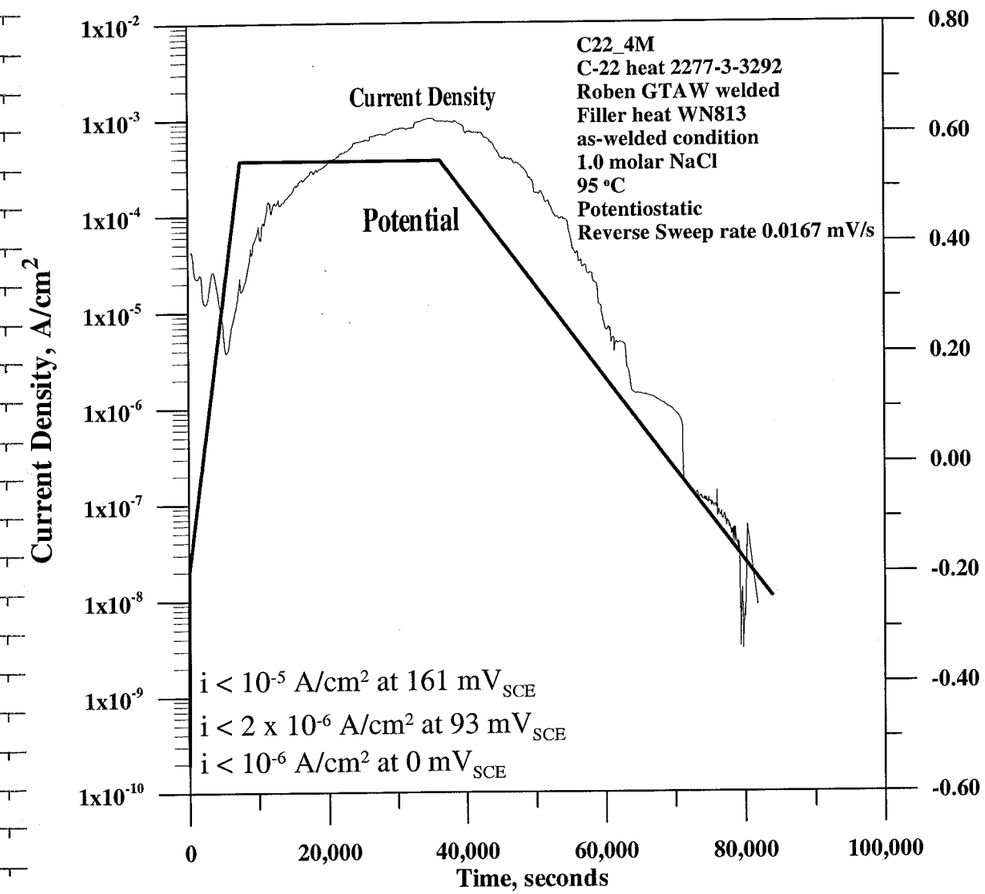

Witnessed & Understood by me,	Date	Invented by	Date
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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072
Cal: 4/11/05 **Due:** 10/11/05

Initial Weight: 23.45909g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 23.26402g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 4M NaCl
467.52g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883
Cal: 1/14/05 **Due:** 7/14/05

Initial pH: 6.94 **Model:** Orion EA 940 **SN:** 2330
Final pH: 7.65 **Cal:7/21/04** **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95° C **Measured with Hg Thermometer** **SN:** 323007
Cal: 10/14/04 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: -345 mV$_{SCE}$ **Model:** Keithley 614 **SN:** 467374
Ept: +232 mV$_{SCE}$ **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_3B

Number of Crevice Corrosion Sites: 22/24 (24 max.)

Twenty-two crevice corrosionsites.
Mild surface staining.

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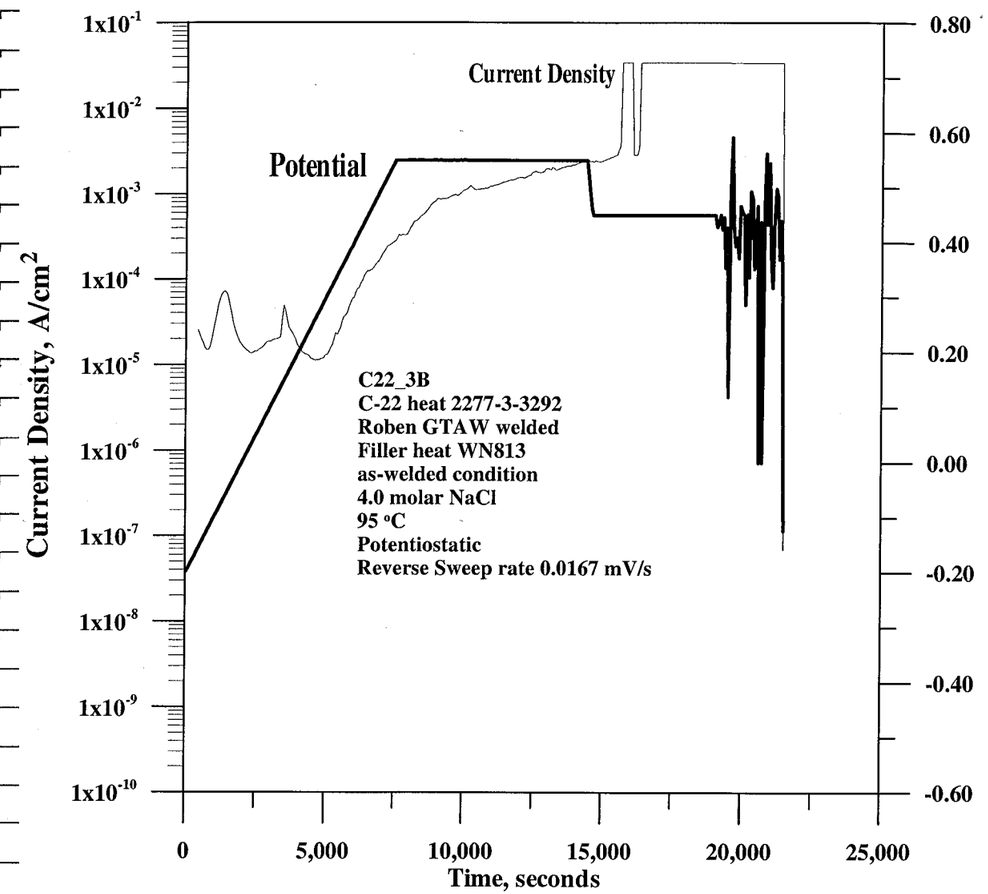

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.08381 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 22.99166 g **Cal:** 05/11/05 **Due:** 11/11/05

Solution: 4M NaCl
467.53g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 6.65 **Model:** Orion EA 940 **SN:** 2330
Final pH: 7.32 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95° C **Measured with Hg Thermometer** **SN:** E98-191 **Cal:** 01/07/05 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: -351 mVSCE **Model:** Keithley 614 **SN:** 467374
Ept: + 198 mVSCE **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_4B

Number of Crevice Corrosion Sites: 11 /24 (24 max.)

Eleven crevice corrosion sites.
Mild surface staining.

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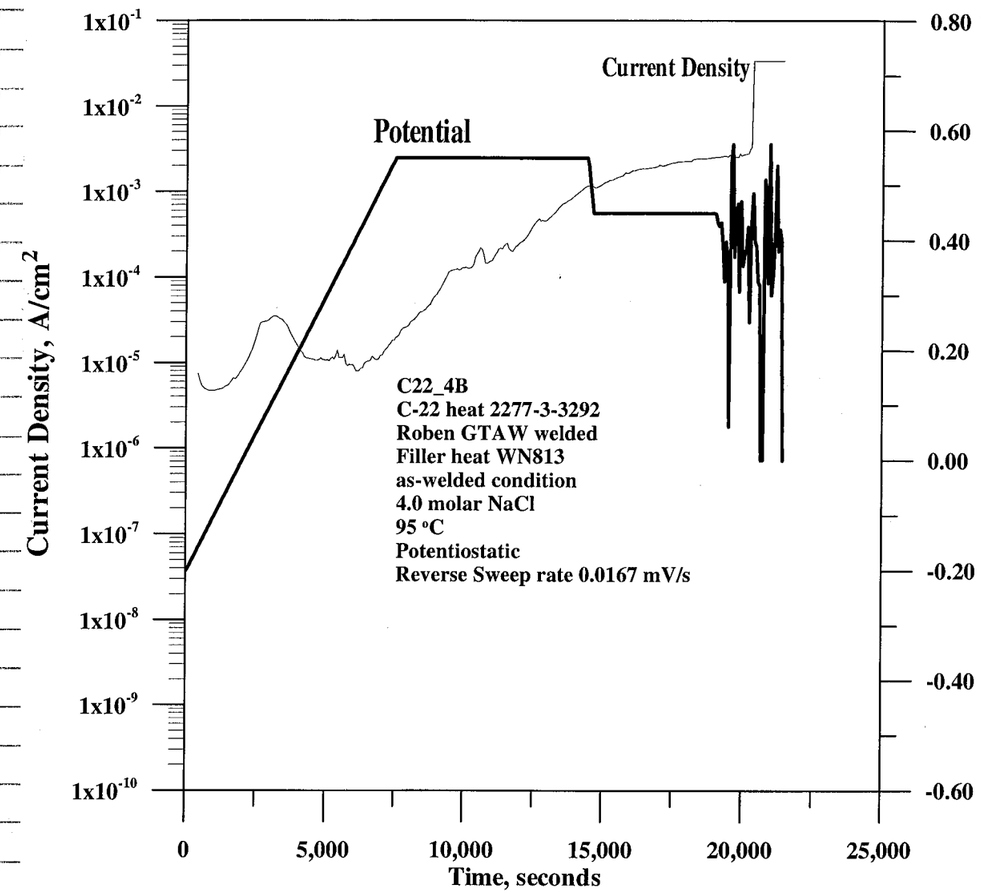

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 23.14487g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 23.14404g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 0.001M NaCl
0.117g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 5.62 **Model:** Orion EA 940 **SN:** 2330
Final pH: 7.98 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** 323007 **Cal:** 10/14/04 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −388 mV$_{SCE}$ **Model:** Keithley 614 **SN:** 467374
Ept: + 26 mV$_{SCE}$ **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_5T

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Light staining.

* Repolish for further use.

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Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by Steve Young	5/26/05

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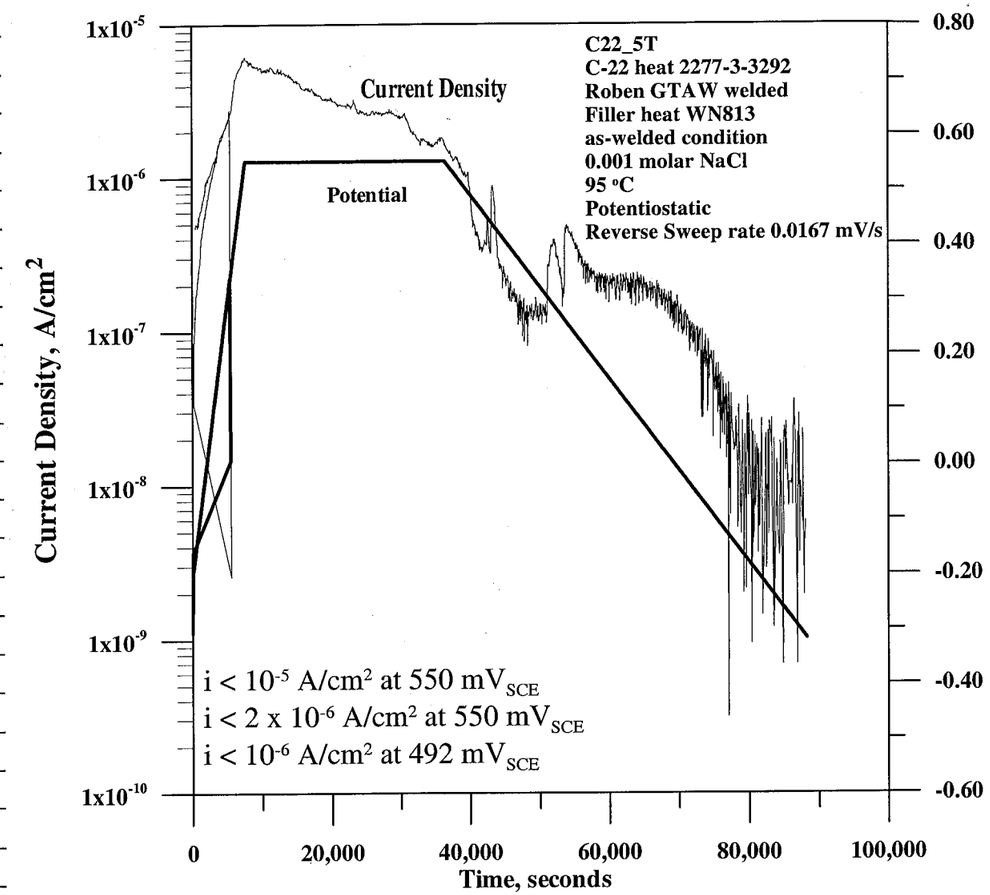

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 23.12863g **Final Weight:** 23.12773g	**Model:** Sartorius Genius **Cal:** 05/11/05	**SN:** 12809099 **Due:** 11/11/05
Solution: 0.001M NaCl 0.118g NaCl Lot: 050089 + DI to 2L		
Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 5.82 **Final pH:** 7.79	**Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 95°C	**Measured with Hg Thermometer** **Cal:** 01/07/05	**SN:** E98-191 **Due:** 07/07/05
Counter Electrode: Platinum Flag		
Reference Electrode: Fisher 13-620-51		**SN:** 7282317
Gas: 99.999% Nitrogen Gas		
Ecorr: -312 mVSCE **Ept:** +187 mVSCE	**Model:** Keithley 614 **Cal:** 12/2/04	**SN:** 467374 **Due:** 12/2/05
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_6T

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No Corrosion.
Light staining.

* Repolish for further testing.

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		Recorded by Steve Young	5/26/05

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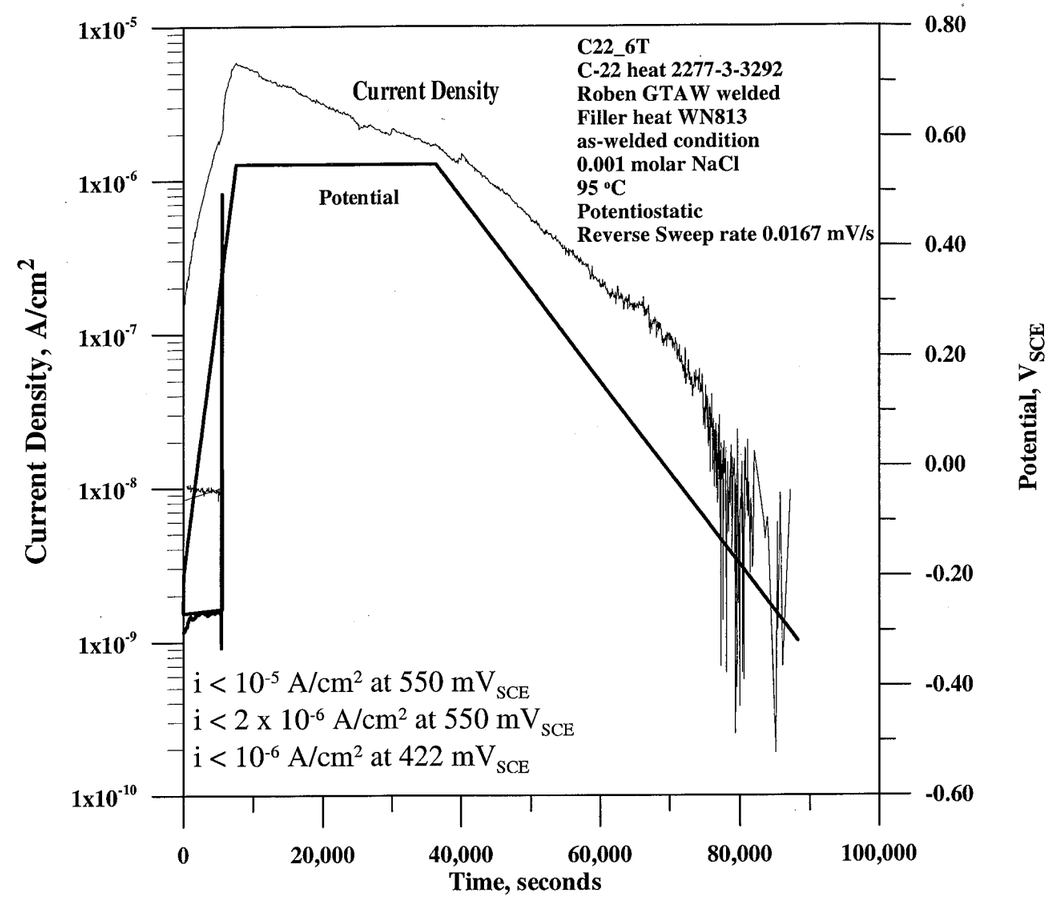

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		Recorded by Steve Young	5/26/05

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 # 20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 22.98242g **Final Weight:** 22.98069g **Model:** Sartorius Genius **Cal:** 5/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 0.01M NaCl
1.170g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.51 **Final pH:** 6.35 **Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 10/14/04 **SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: -346mV$_{SCE}$ **Ept:** -207mV$_{SCE}$ **Model:** Keithley 614 **Cal:** 12/2/04 **SN:** 467374 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_5M

Number of Crevice Corrosion Sites: 0/24 (24 max.)

No corrosion.
Mild surface staining.

* Repolish for further testing.

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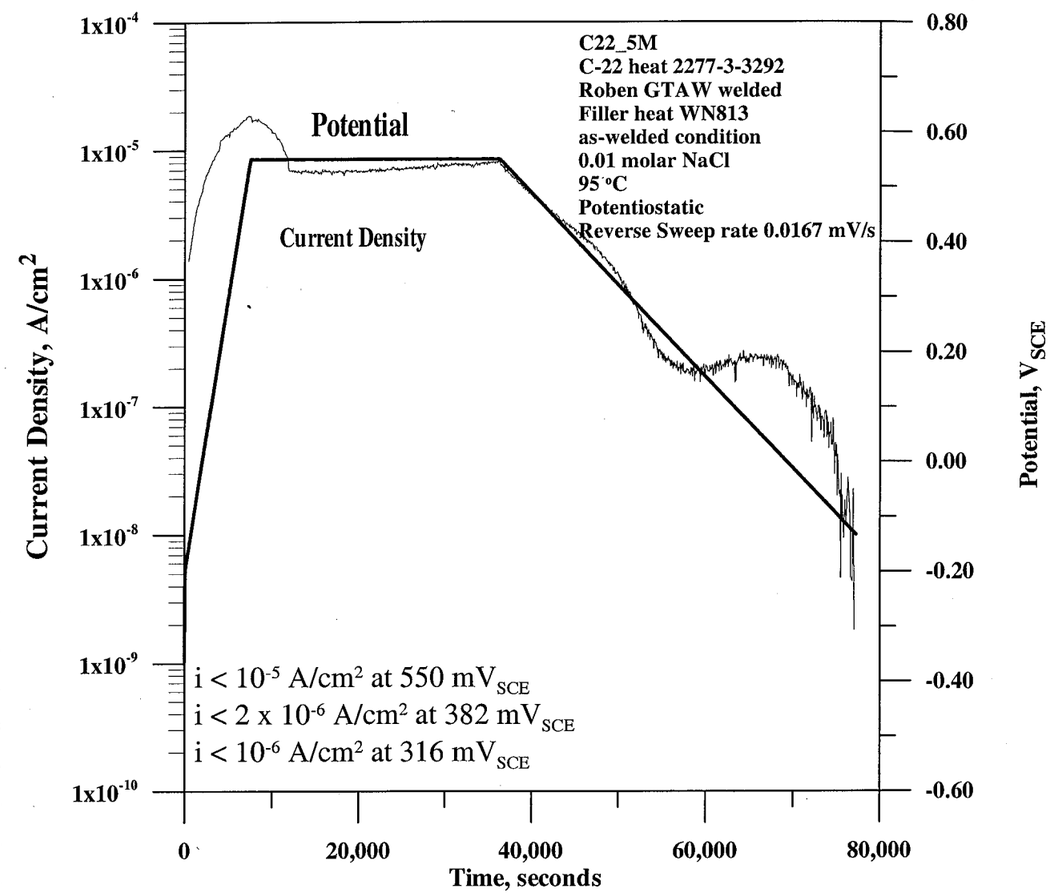

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		Recorded by Steve Young	6/20/05

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 10/5/05 SBY # 20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 23.06083 g **Final Weight:** 23.05933 g	**Model:** Sartorius Genius **Cal:** 05/11/05	**SN:** 12809099 **Due:** 11/11/05
Solution: 0.01M NaCl 1.170 g NaCl Lot: 050089 + DI to 2L		
Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 5.8 **Final pH:** 6.7	**Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 95°C	**Measured with Hg Thermometer** **Cal:** 01/07/05	**SN:** E98-191 **Due:** 07/07/05
Counter Electrode: Platinum Flag		
Reference Electrode: Fisher 13-620-51		**SN:** 7282317
Gas: 99.999% Nitrogen Gas		
Ecorr: − 436 mV$_{SCE}$ **Ept:** − 96 mV$_{SCE}$	**Model:** Keithley 614 **Cal:** 12/2/04	**SN:** 467374 **Due:** 12/2/05
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_6M

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Mild surface staining.

* Repolish for further testing.

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		Recorded by Steve Young	6/7/05

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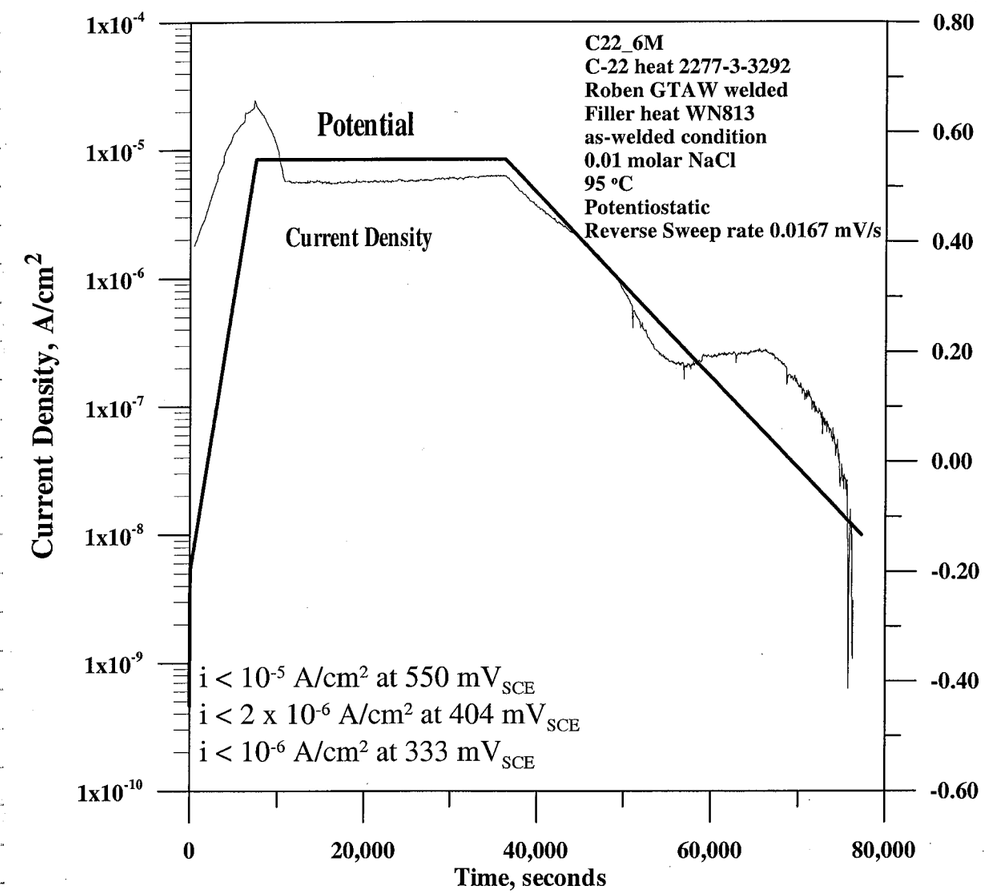

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.25062 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 23.24630 g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 0.1M NaCl
11.688g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.4 **Model:** Orion EA 940 **SN:** 2330
Final pH: 8.4 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** 323007 **Cal:** 10/14/04 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: - 323 mV_{SCE} **Model:** Keithley 614 **SN:** 467374
Ept: + 61 mV_{SCE} **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_5B

Number of Crevice Corrosion Sites: 1 /24 (24 max.)

1 corrosion site.
Mild surface staining.

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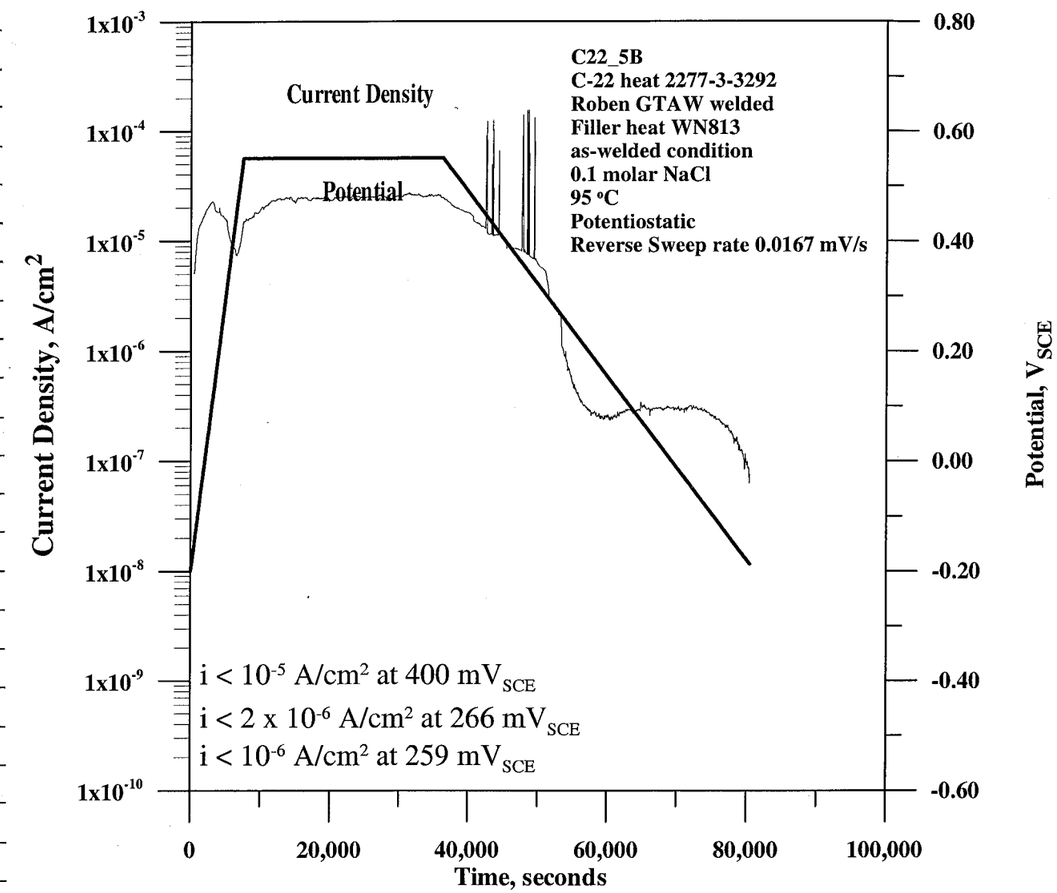

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.33014 g **Final Weight:** 23.32769 g **Model:** Sartorius Genius **Cal:** 05/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 0.1M NaCl
11.690g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.6 **Final pH:** 7.9 **Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 01/07/05 **SN:** E98-191 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: −350 mV$_{SCE}$ **Ept:** + 138 mV$_{SCE}$ **Model:** Keithley 614 **Cal:** 12/2/04 **SN:** 467374 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_6B

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Light surface staining.

* Repolish for further testing.

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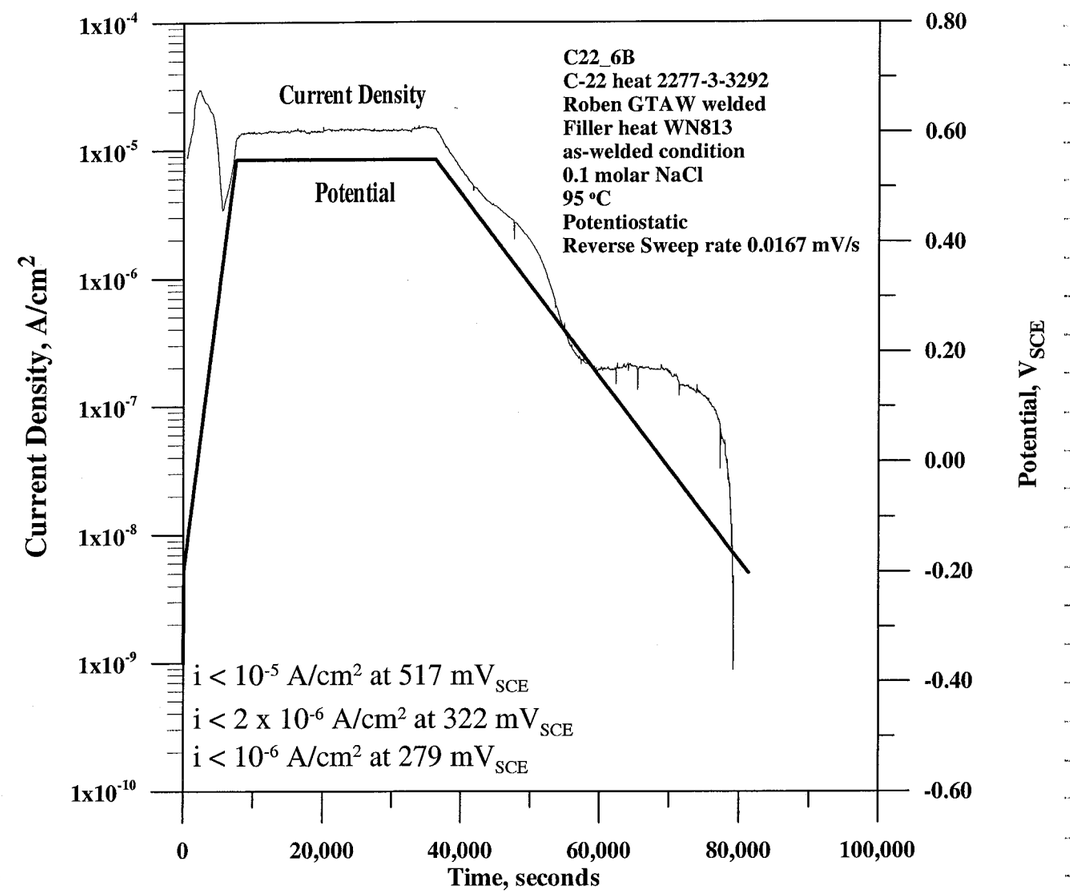

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 23.50487 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 23.49505 g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 0.5M NaCl
58.43g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 6.0 **Model:** Orion EA 940 **SN:** 2330
Final pH: 8.1 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** 323007 **Cal:** 10/14/04 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −448 mV$_{SCE}$ **Model:** Keithley 614 **SN:** 467374
Ept: +135 mV$_{SCE}$ **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_7T

Number of Crevice Corrosion Sites: 2 /24 (24 max.)

Two crevice corrosion sites.
Mild surface staining.

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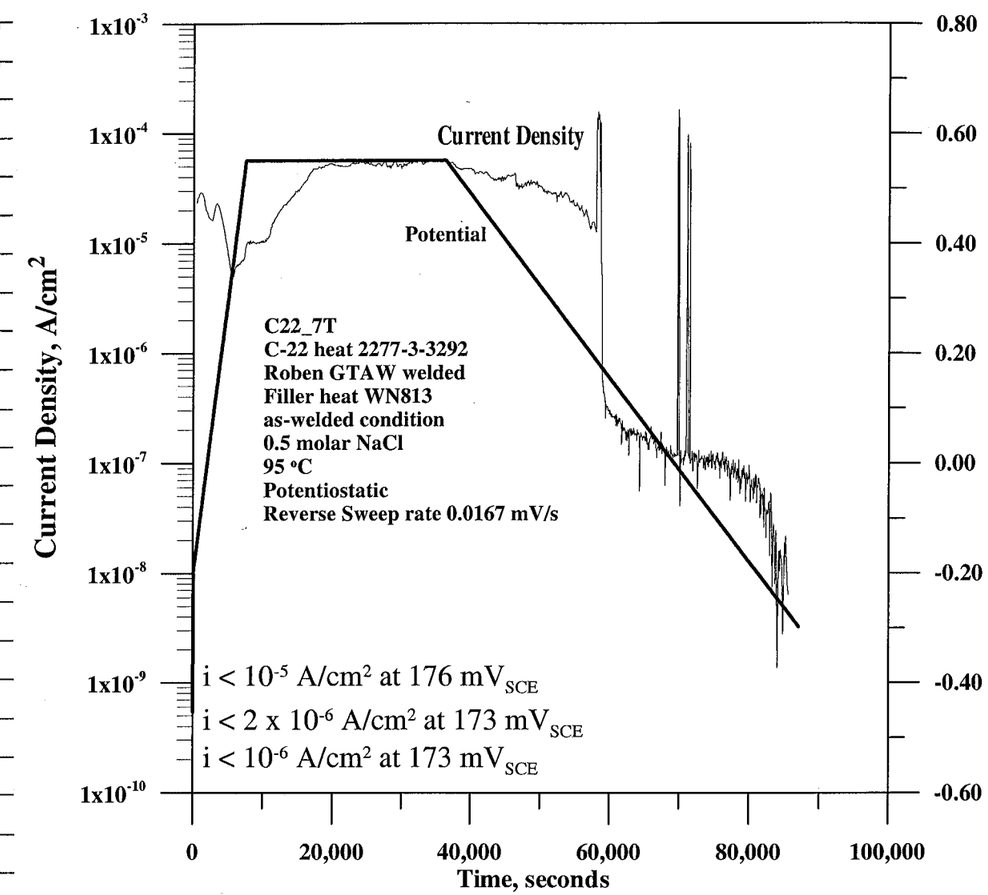

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.07384g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 23.06046g **Cal:** 05/11/05 **Due:** 11/11/05

Solution: 0.5M NaCl
58.44g NaCl Lot: 050089
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 6.0 **Model:** Orion EA 940 **SN:** 2330
Final pH: 8.1 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** E98-191 **Cal:** 01/07/05 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: −379 mV_{SCE} **Model:** Keithley 614 **SN:** 467374
Ept: +161 mV_{SCE} **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_8T

Number of Crevice Corrosion Sites: 2 /24 (24 max.)

Two corrosion sites.
Mild surface staining.

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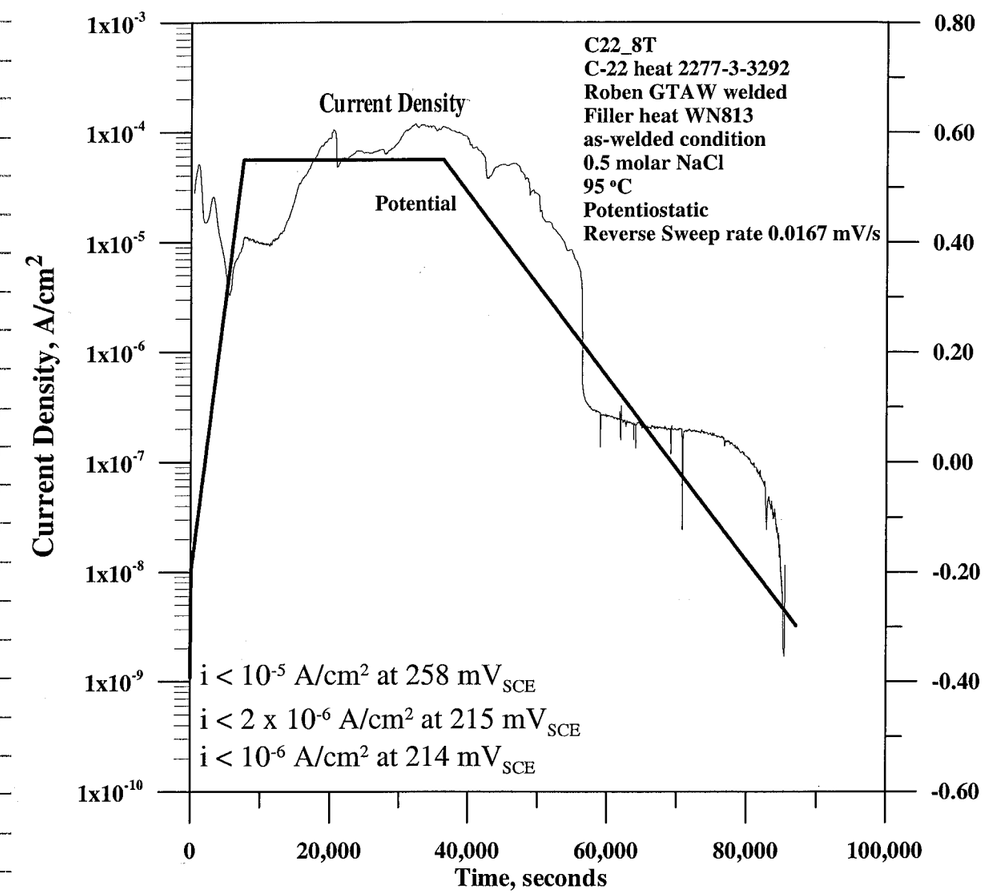

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 23.05748 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 23.03937 g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 1M NaCl
116.88g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 5.9 **Model:** Orion EA 940 **SN:** 2330
Final pH: 8.0 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** 323007 **Cal:** 10/14/04 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: − 439 mV_{SCE} **Model:** Keithley 614 **SN:** 467374
Ept: − 292 mV_{SCE} **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_7M

Number of Crevice Corrosion Sites: 1 /24 (24 max.)

One crevice corrosion site.
Mild surface staining.

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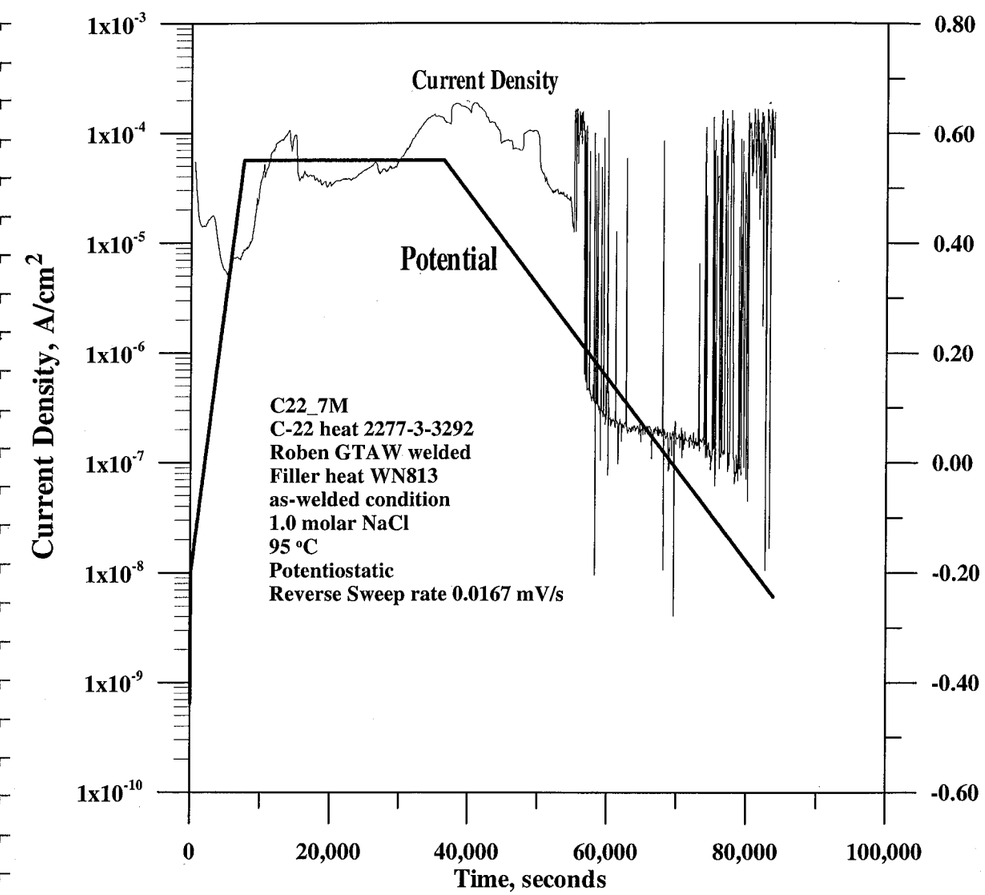

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 23.17208 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 23.11356 g **Cal:** 05/11/05 **Due:** 11/11/05

Solution: 1M NaCl
116.88g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 6.1 **Model:** Orion EA 940 **SN:** 2330
Final pH: 8.0 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** E98-191 **Cal:** 01/07/05 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: −490 mV$_{SCE}$ **Model:** Keithley 614 **SN:** 467374
Ept: +6 mV$_{SCE}$ **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_8M

Number of Crevice Corrosion Sites: 2 /24 (24 max.)

Two crevice corrosion sites.
Mild surface staining.

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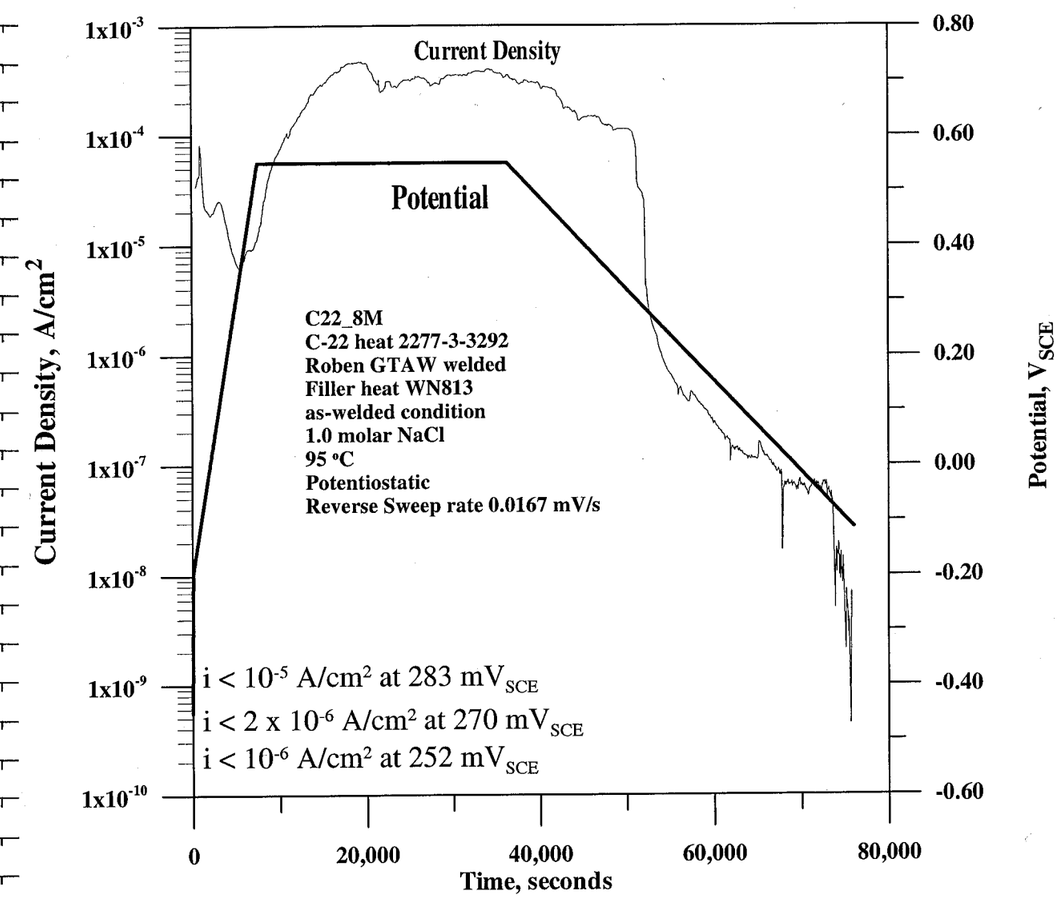

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 23.10122g **Final Weight:** 22.868769g **Model:** Sartorius Genius **Cal:** 5/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 4M NaCl
467.52g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 7.7 **Final pH:** 7.6 **Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 10/14/04 **SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −501 mV_{SCE} **Ept:** −259 mV_{SCE} **Model:** Keithley 614 **Cal:** 12/2/04 **SN:** 467374 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_7B

Number of Crevice Corrosion Sites: 18/24 (24 max.)

Eighteen crevice corrosion sites.
Mild surface staining.

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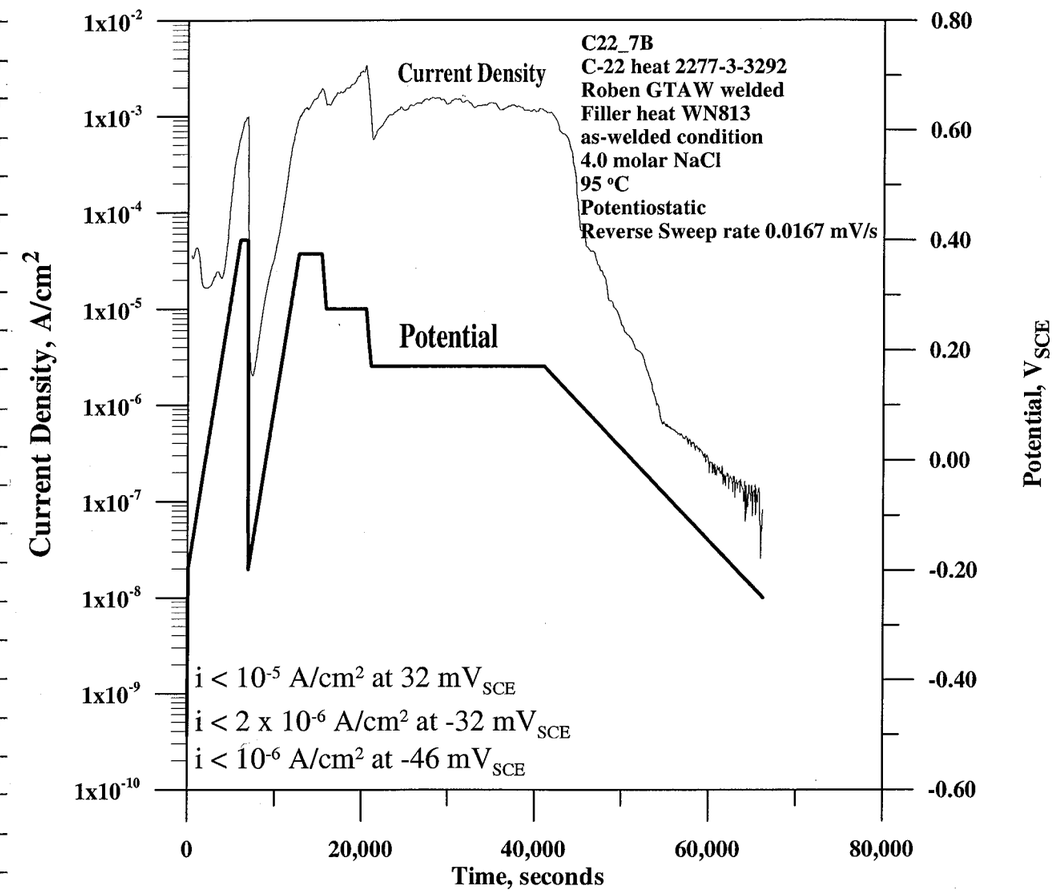

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3260~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 22.99634 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 22.86189 g **Cal:** 05/11/05 **Due:** 11/11/05

Solution: 4M NaCl
467.52g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 8.1 **Model:** Orion EA 940 **SN:** 2330
Final pH: 7.6 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** E98-191 **Cal:** 01/07/05 **Due:** 07/07/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: - 491 mV$_{SCE}$ **Model:** Keithley 614 **SN:** 467374
Ept: + 6 mV$_{SCE}$ **Cal:** 12/2/04 **Due:** 12/2/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_8B

Number of Crevice Corrosion Sites: 12/24 (24 max.)

Twelve crevice corrosion sites.
Mild surface staining.

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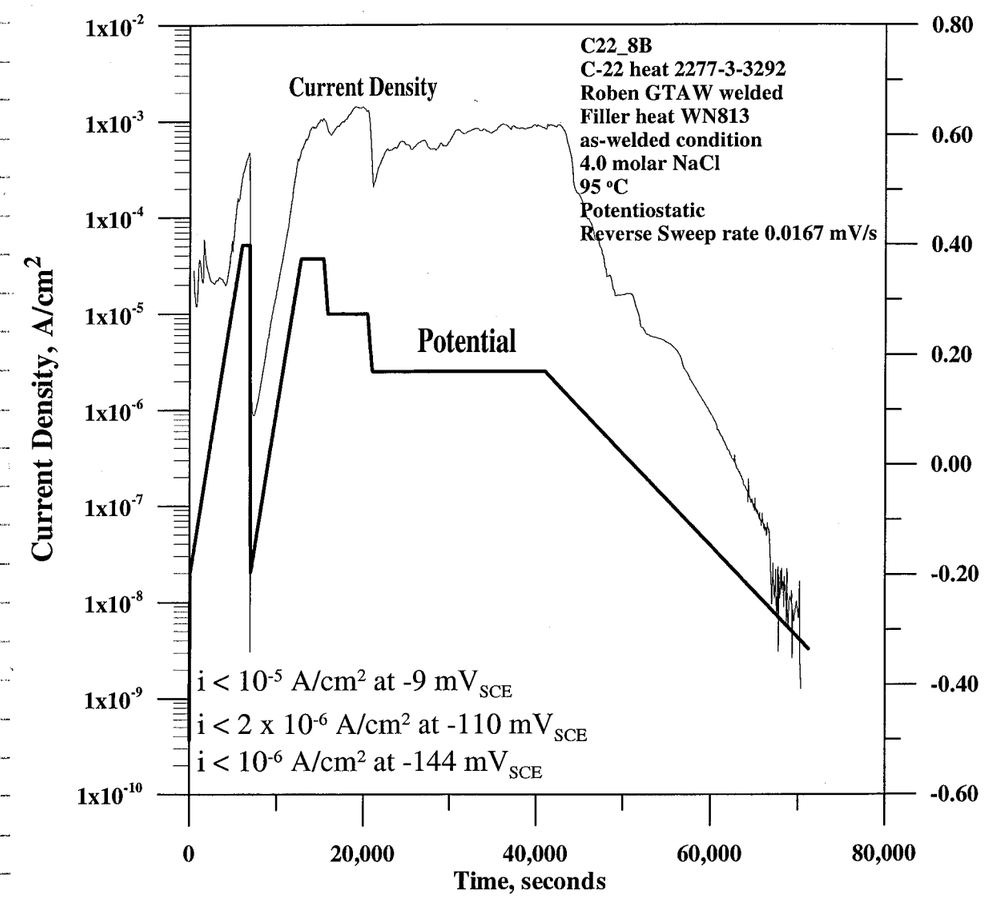

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THERMALLY AGED PROCEDURE

Quanity/Specimens = C22 HT# 2277-3-3292 Roben GTAW welders filler HT# WA 813

OVEN= Lindberg SN# 90917Z model # 51333

OVEN SETPOINT= 1154°C

OVEN TEMPERATURE= 1132.6°C

Measurement taken with OMEGA MICROPROCESSOR THEMOMETER MODEL# HH22

Thermocouple= SN#= T 94140 CAL= 5/12/05 DUE= 11/11/05
SN#= #328 Cal = 2/7/05 Due = 8/5/05

AMOUNT OF TIME = 20 min. @ oven set point

DETAILS= Helo 12 Specimens at Temperature
for 20 min then Water Quenched
All Specimens were polished To 400 Grit
finish PRIOR To Thermally Aged Procedure
then Polished To 600 Grit After Procedure

6/16/05

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 S8Y 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 22.9387 6g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 22.9375 1g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 0.001M NaCl
0.116g NaCl Lot: 045904

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.8 **Final pH:** 7.7 **Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 10/14/04 **SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: -388 mV$_{SCE}$ **Ept:** +1.1 mV$_{SCE}$ **Model:** Keithley 617 **Cal:** 5/27/05 **SN:** 537418 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_9T

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Light surface staining.

* Repolish for further testing.

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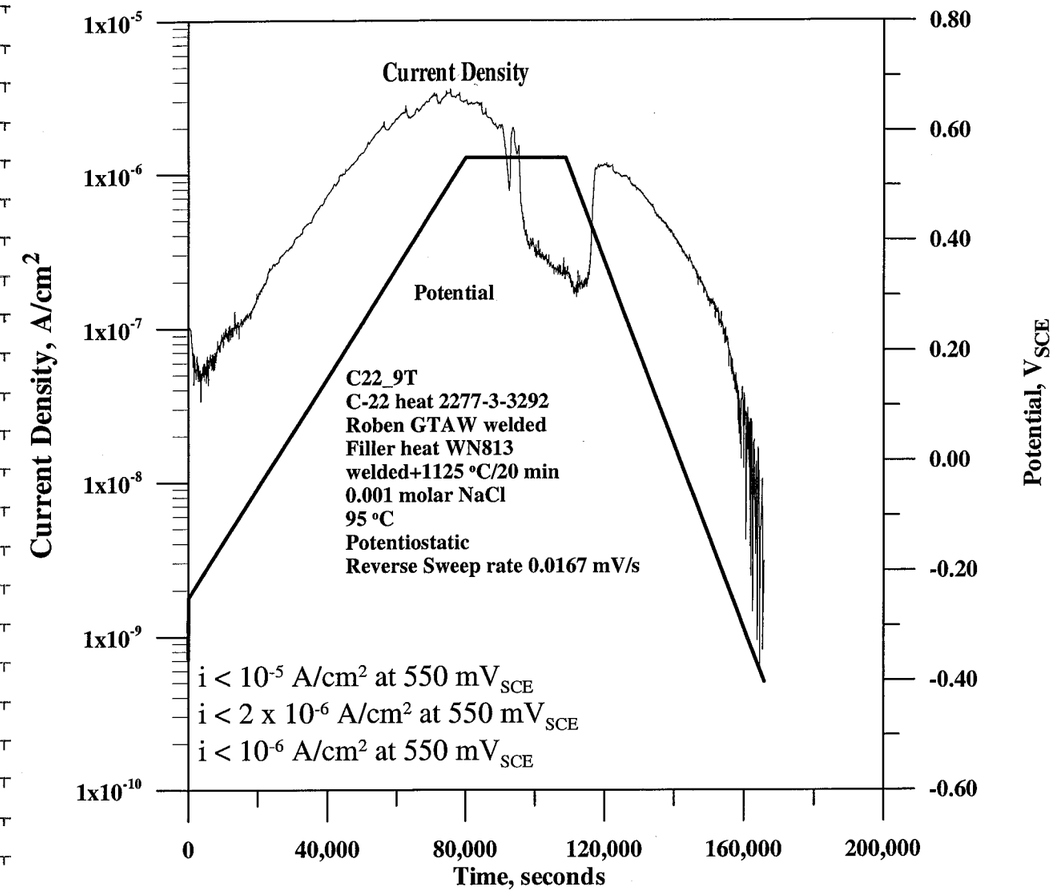

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		Recorded by Steve Young	7/21/05

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 22.68893 g **Final Weight:** 22.68752 g	**Model:** Sartorius Genius **Cal:** 05/11/05	**SN:** 12809099 **Due:** 11/11/05
Solution: 0.001M NaCl 0.118g NaCl Lot: 045904 + DI to 2L		
Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 5.9 **Final pH:** 7.6	**Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 95°C	**Measured with Hg Thermometer** **Cal:** 5/06/05	**SN:** H98-182 **Due:** 5/05/06
Counter Electrode: Platinum Flag		
Reference Electrode: Fisher 13-620-51		**SN:** 7282317
Gas: 99.999% Nitrogen Gas		
Ecorr: −400 mV$_{SCE}$ **Ept:** +135 mV$_{SCE}$	**Model:** Keithley 617 **Cal:** 5/27/05	**SN:** 537418 **Due:** 11/25/05
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_10T

Number of Crevice Corrosion Sites: 0/24 (24 max.)

No corrosion.
Light staining.

* Repolish for further testing.

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		Recorded by Steve Young	6/29/05

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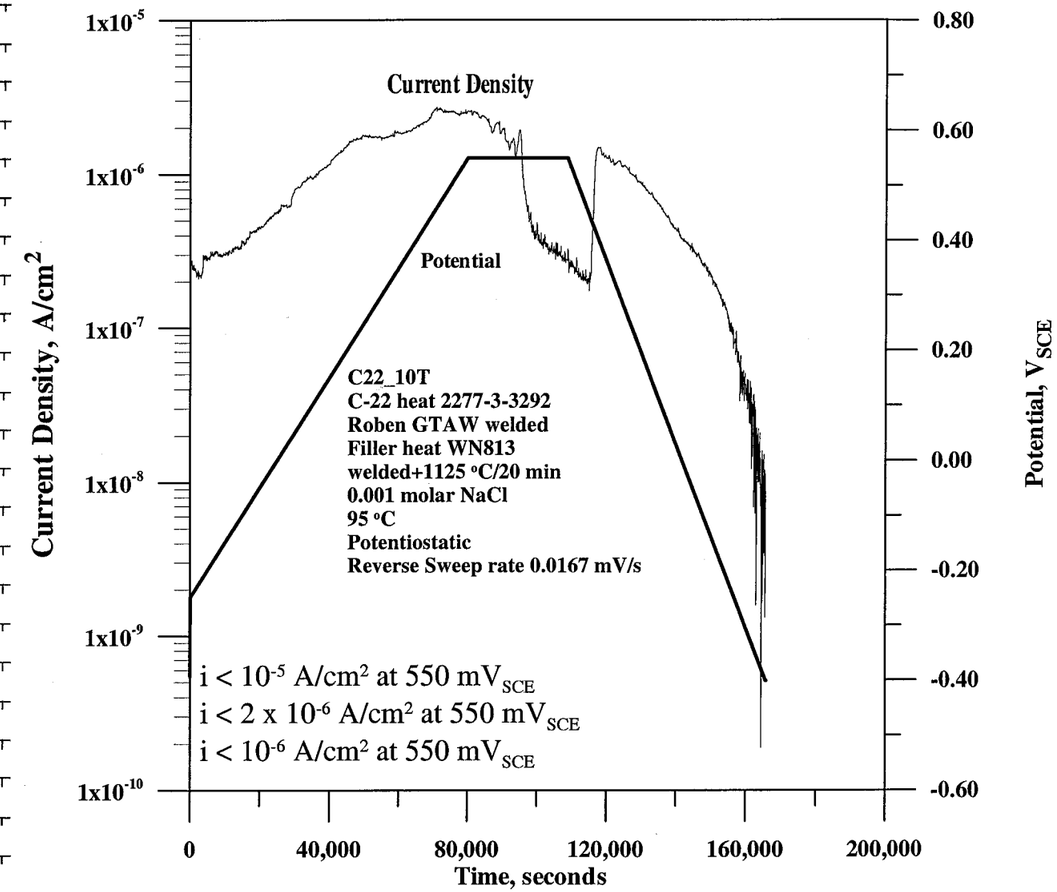

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 58Y 10/5/05 #20.06002.01.322.002.

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 22.73250g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 22.73013g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 0.01M NaCl
1.169g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 5.6 **Model:** Orion EA 940 **SN:** 2330
Final pH: 7.0 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** 323007 **Cal:** 10/14/04 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: -329mV$_{SCE}$ **Model:** Keithley 617 **SN:** 537418
Ept: -314mV$_{SCE}$ **Cal:** 5/27/05 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_9M

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Mild surface staining.

* Repolish for further use.

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	7/6/05	Recorded by Steve Young	7/6/05

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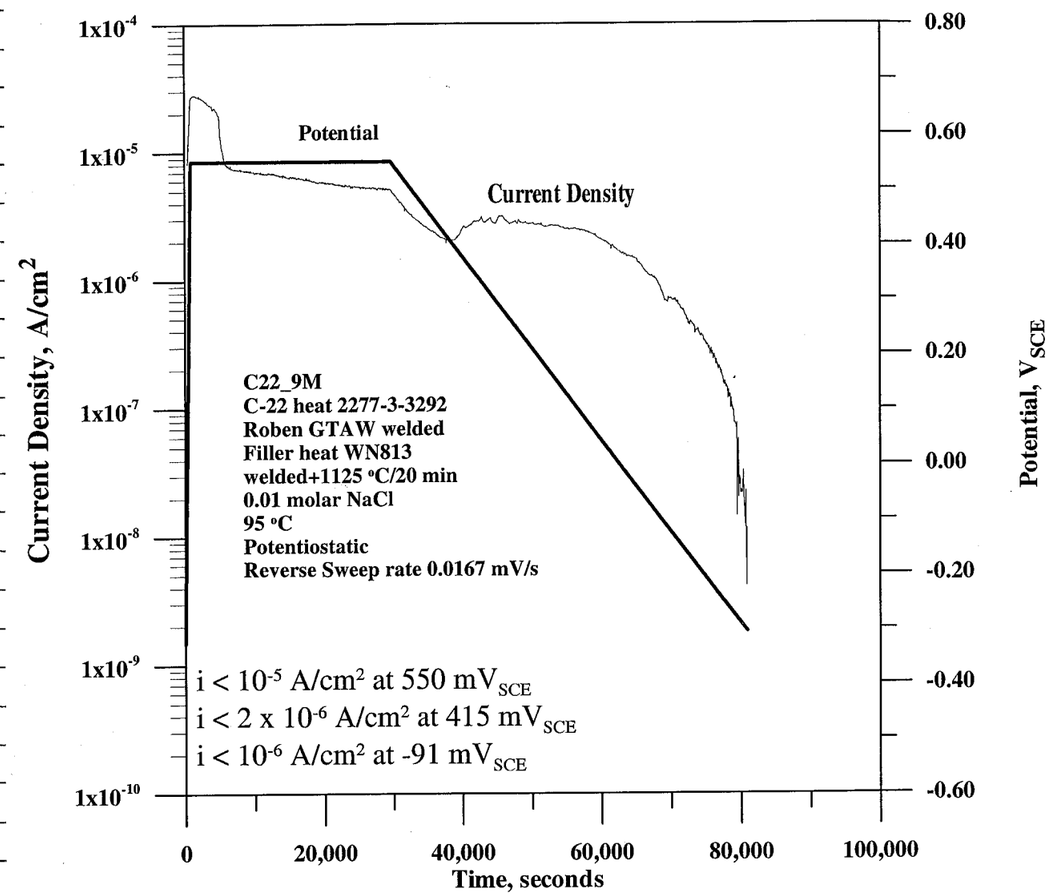

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 22.83718g **Final Weight:** 22.83477g	**Model:** Sartorius Genius **Cal:** 05/11/05	**SN:** 12809099 **Due:** 11/11/05

Solution: 0.01M NaCl
1.169g NaCl Lot: 045904
+ DI to 2L

Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 5.9 **Final pH:** 6.9	**Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 95° C	**Measured with Hg Thermometer** **Cal:** 5/06/05	**SN:** H98-182 **Due:** 5/05/06

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: -336 mV_{SCE} **Ept:** +135 mV_{SCE}	**Model:** Keithley 617 **Cal:** 5/27/05	**SN:** 537418 **Due:** 11/25/05
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_10M

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Mild staining.

* Repolish for further use.

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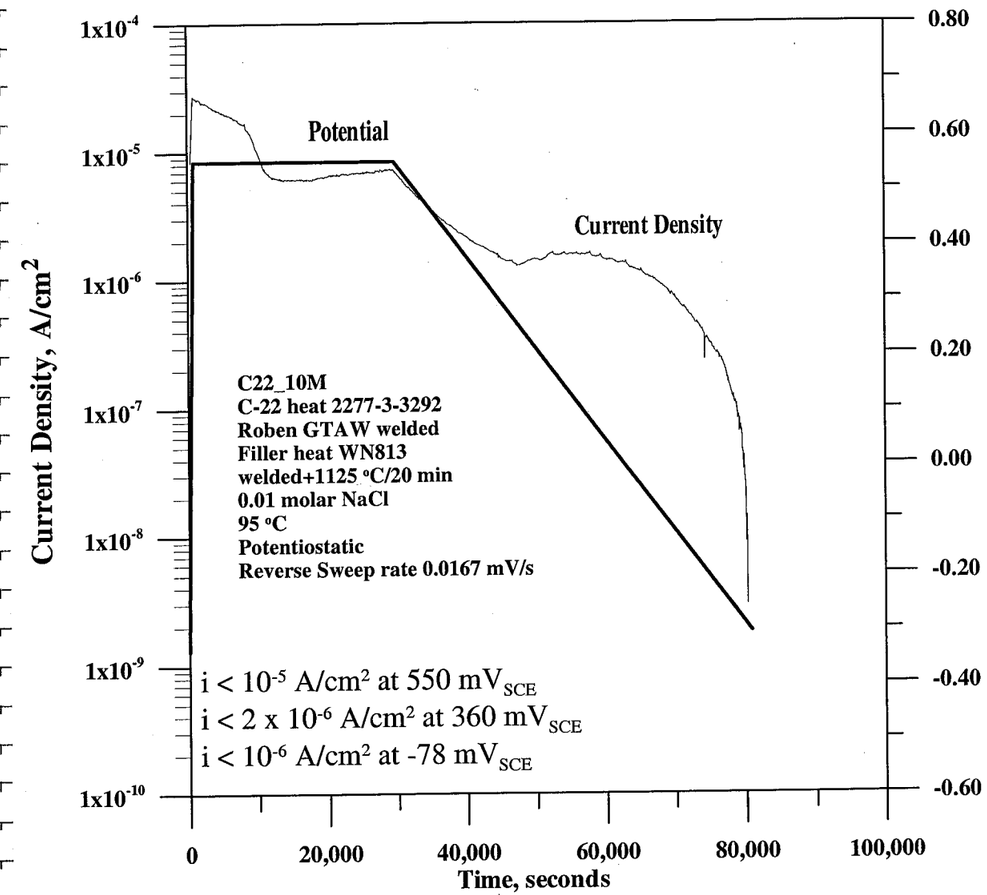

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 22.56386g **Final Weight:** 22.55889g **Model:** Sartorius Genius **Cal:** 5/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 0.1M NaCl
11.689g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 6.1 **Final pH:** 8.4 **Model:** Orion EA 940 **Cal:** 7/21/04 **SN:** 2330 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 10/14/04 **SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: -490mV$_{SCE}$ **Ept:** -423mV$_{SCE}$ **Model:** Keithley 617 **Cal:** 5/27/05 **SN:** 537418 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_9B

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Mild surface staining.

* Repolish for further testing.

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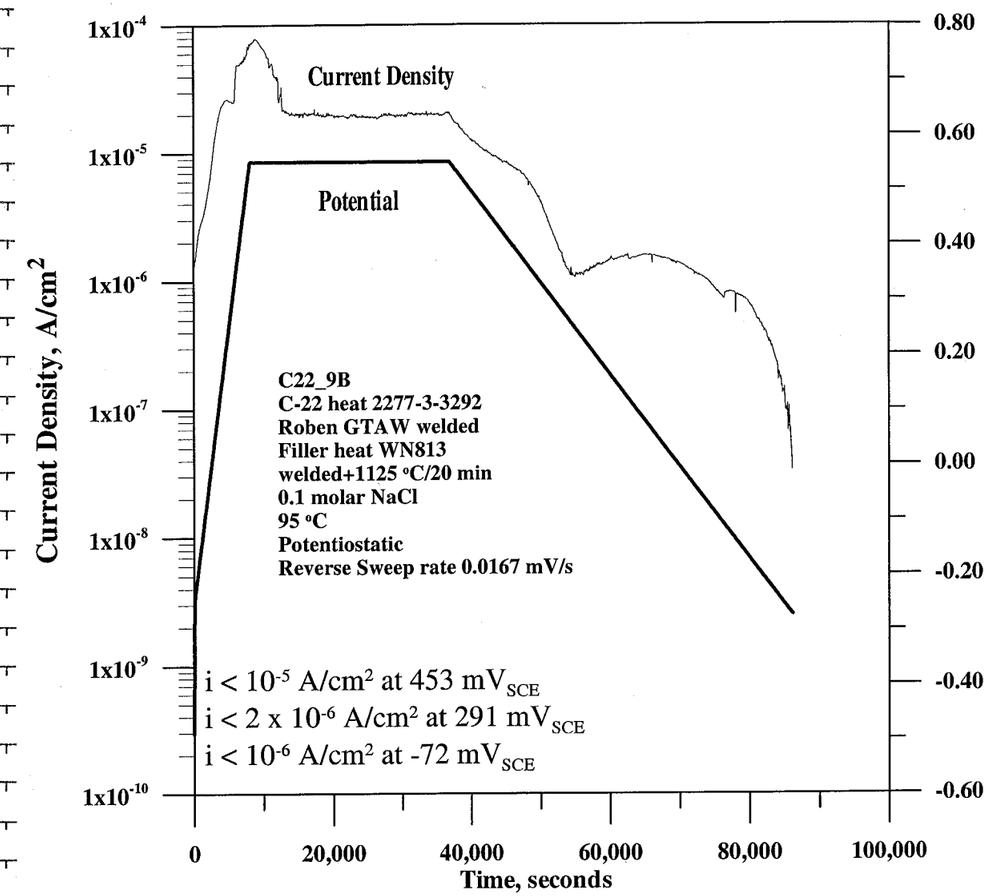

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 22.72297 g **Final Weight:** 22.71932 g **Model:** Sartorius Genius **SN:** 12809099 **Cal:** 05/11/05 **Due:** 11/11/05

Solution: 0.1M NaCl
11.689g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 5.9 **Final pH:** 8.3 **Model:** Orion EA 940 **SN:** 2330 **Cal:** 7/21/04 **Due:** 7/21/05 **pH Probe:** #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** H98-182 **Cal:** 5/06/05 **Due:** 5/05/06

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: −513 mV$_{SCE}$ **Ept:** −143 mV$_{SCE}$ **Model:** Keithley 617 **SN:** 537418 **Cal:** 5/27/05 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_10B

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Mild surface staining.

* Repolish for further use.

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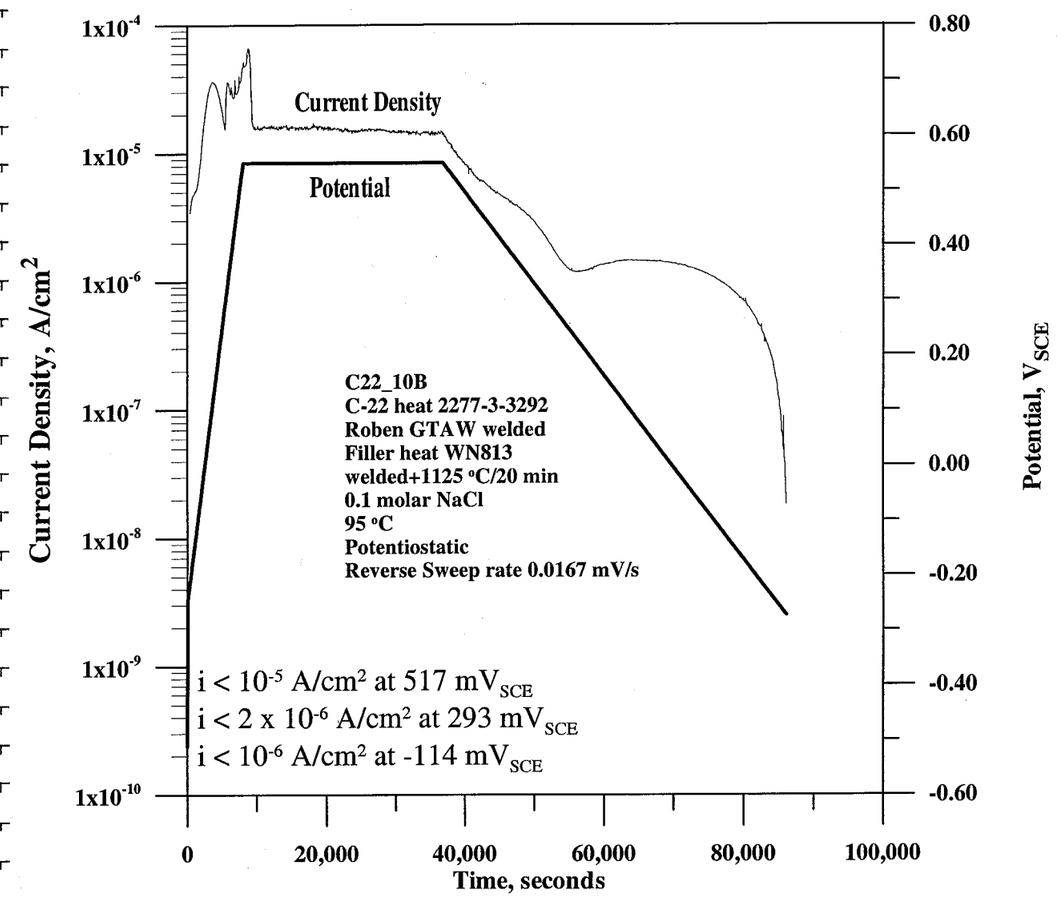

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 22.35666g **Final Weight:** 22.32298g **Model:** Sartorius Genius **Cal:** 5/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 0.5M NaCl
58.44g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 6.0 **Final pH:** 8.1 **Model:** Orion EA 940 **Cal:** 7/21/04 **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **Cal:** 10/14/04 **SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −490 mV_{SCE} **Ept:** +189 mV_{SCE} **Model:** Keithley 617 **Cal:** 5/27/05 **SN:** 537418 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_11T

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Mild surface staining.

* Repolish for further use.

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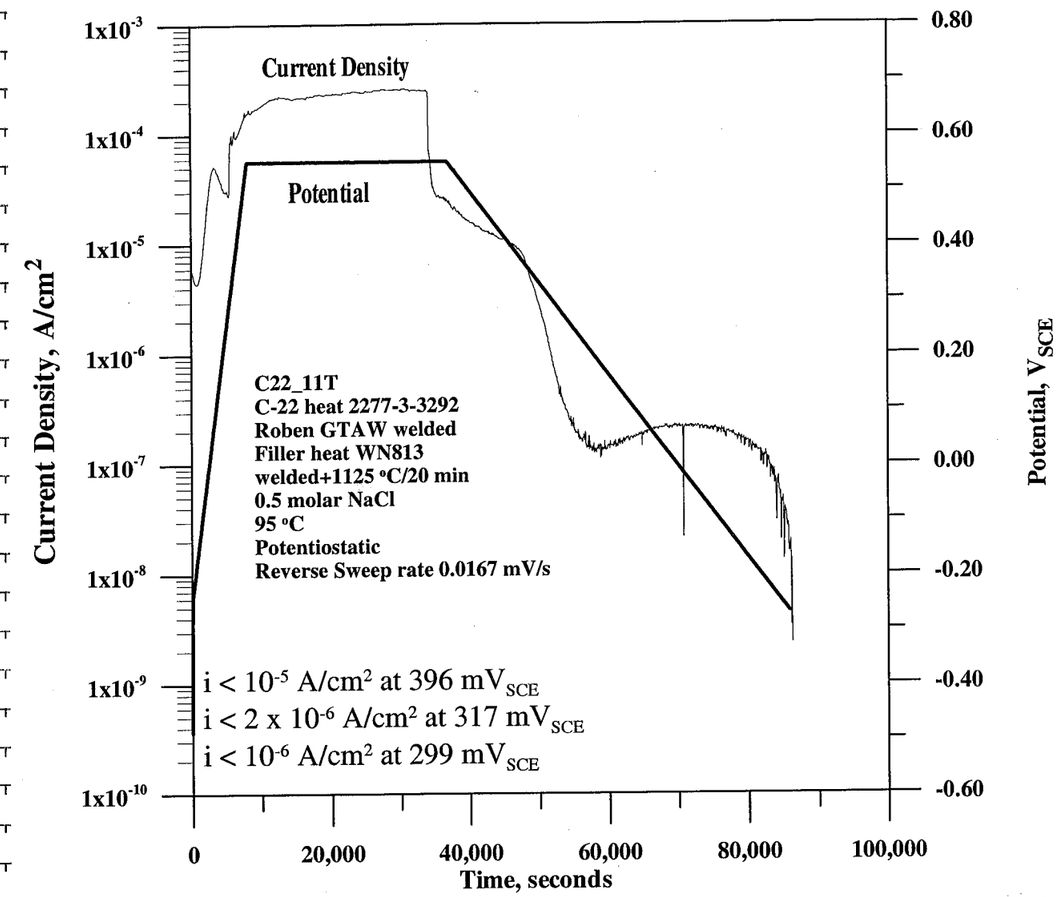

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 # 20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 22.30839 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 22.30634 g **Cal:** 05/11/05 **Due:** 11/11/05

Solution: 0.5M NaCl
58.44g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 6.2 **Model:** Orion EA 940 **SN:** 2330
Final pH: 8.1 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95° C **Measured with Hg Thermometer** **SN:** H98-182 **Cal:** 5/06/05 **Due:** 5/05/06

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: − 532 mV$_{SCE}$ **Model:** Keithley 617 **SN:** 537418
Ept: + 166 mV$_{SCE}$ **Cal:** 5/27/05 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_12T

Number of Crevice Corrosion Sites: 0/24 (24 max.)

No corrosion.
Light surface staining.

* Repolish for further use.

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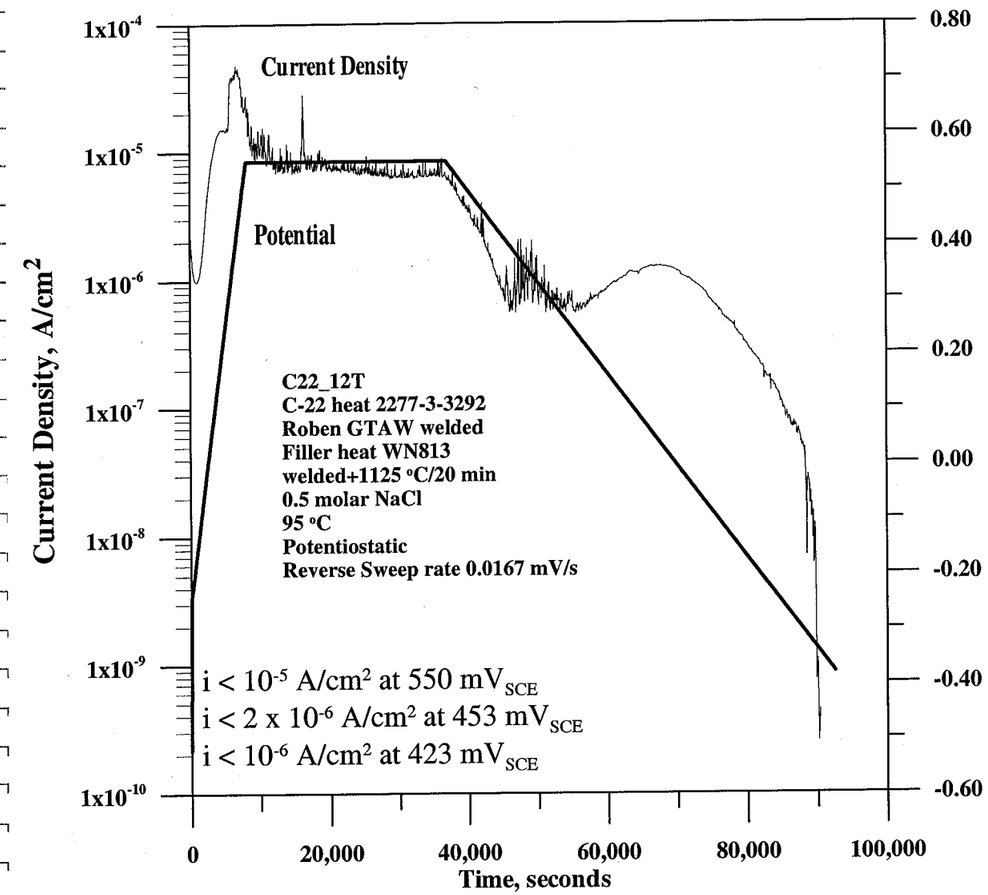

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 22.38192 g **Final Weight:** 22.37571 g **Model:** Sartorius Genius **Cal:** 5/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 1M NaCl
116.89g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 6.1 **Final pH:** 8.0 **Model:** Orion EA 940 **Cal:7/21/04** **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95° C **Measured with Hg Thermometer** **Cal:** 10/14/04 **SN:** 323007 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −423 mV_{SCE} **Ept:** −102 mV_{SCE} **Model:** Keithley 617 **Cal:** 5/27/05 **SN:** 537418 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_11M

Number of Crevice Corrosion Sites: 1 /24 (24 max.)

One crevice corrosion site.
Light staining.

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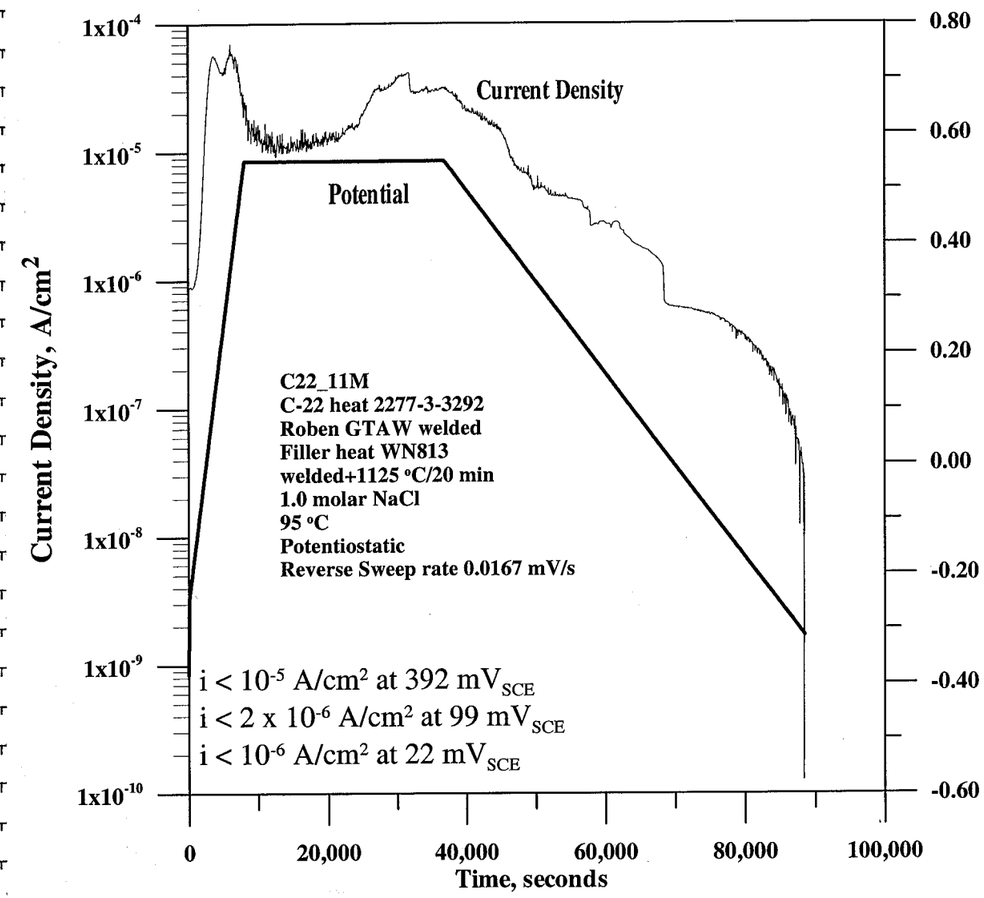

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **Cal:** 4/11/05 **SN:** 139072 **Due:** 10/11/05

Initial Weight: 22.12860g **Final Weight:** 22.12498g **Model:** Sartorius Genius **Cal:** 05/11/05 **SN:** 12809099 **Due:** 11/11/05

Solution: 1M NaCl
116.89g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **Cal:** 1/14/05 **SN:** 2883 **Due:** 7/14/05

Initial pH: 5.9 **Final pH:** 8.0 **Model:** Orion EA 940 **Cal:7/21/04** **pH Probe:** #13-620-296 **SN:** 2330 **Due:** 7/21/05 **SN:** 4079126

Test Temperature: 95° C **Measured with Hg Thermometer** **Cal:** 5/06/05 **SN:** H98-182 **Due:** 5/05/06

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: -445 mV_{SCE} **Ept:** -8.63 mV_{SCE} **Model:** Keithley 617 **Cal:** 5/27/05 **SN:** 537418 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_12M

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion.
Light staining.

* Repolish for further use.

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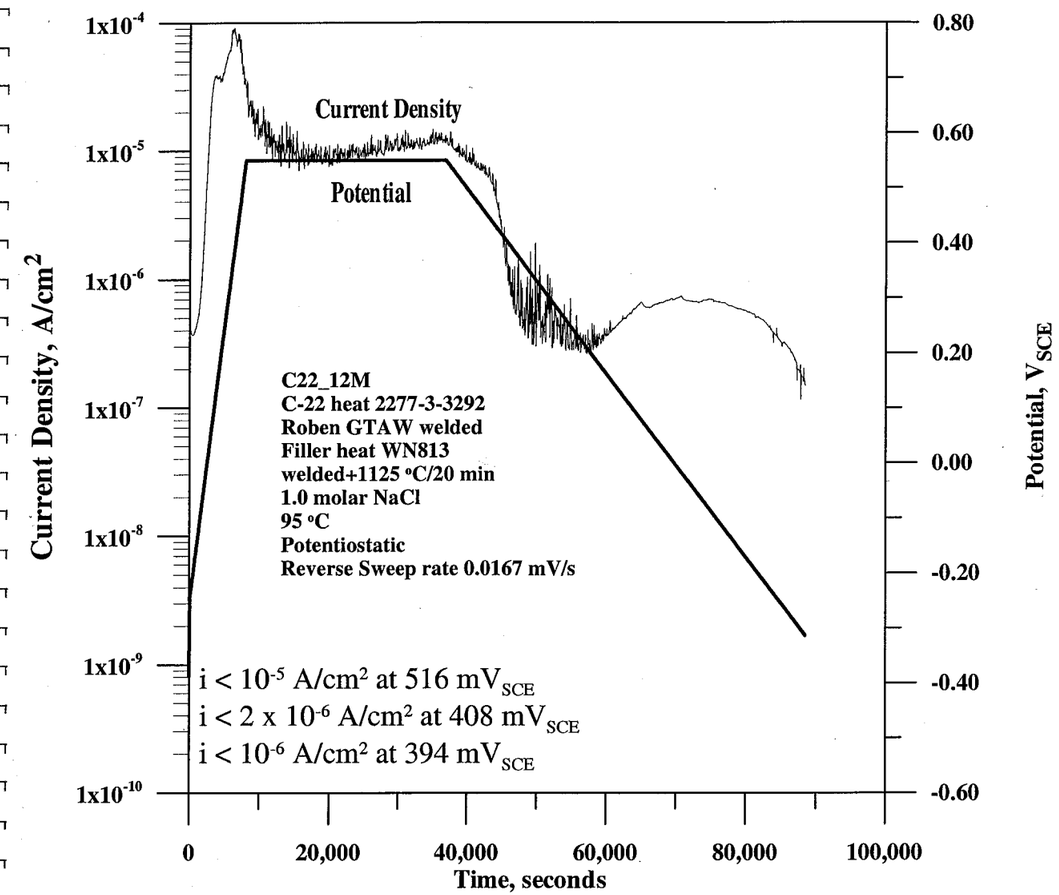

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBy 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torque to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 22.66201g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 22.57498g **Cal:** 5/11/05 **Due:** 11/11/05

Solution: 4M NaCl
467.53g NaCl Lot: 045904
+ DI to 2L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 1/14/05 **Due:** 7/14/05

Initial pH: 8.0 **Model:** Orion EA 940 **SN:** 2330
Final pH: 7.5 **Cal:** 7/21/04 **Due:** 7/21/05
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95° C **Measured with Hg Thermometer** **SN:** 323007 **Cal:** 10/14/04 **Due:** 10/14/05

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-52 **SN:** 4028036

Gas: 99.999% Nitrogen Gas

Ecorr: −437 mV_{SCE} **Model:** Keithley 617 **SN:** 537418
Ept: −497 mV_{SCE} **Cal:** 5/27/05 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_11B

Number of Crevice Corrosion Sites: 12 /24 (24 max.)

Twelve crevice corrosion sites.
Mild surface staining.

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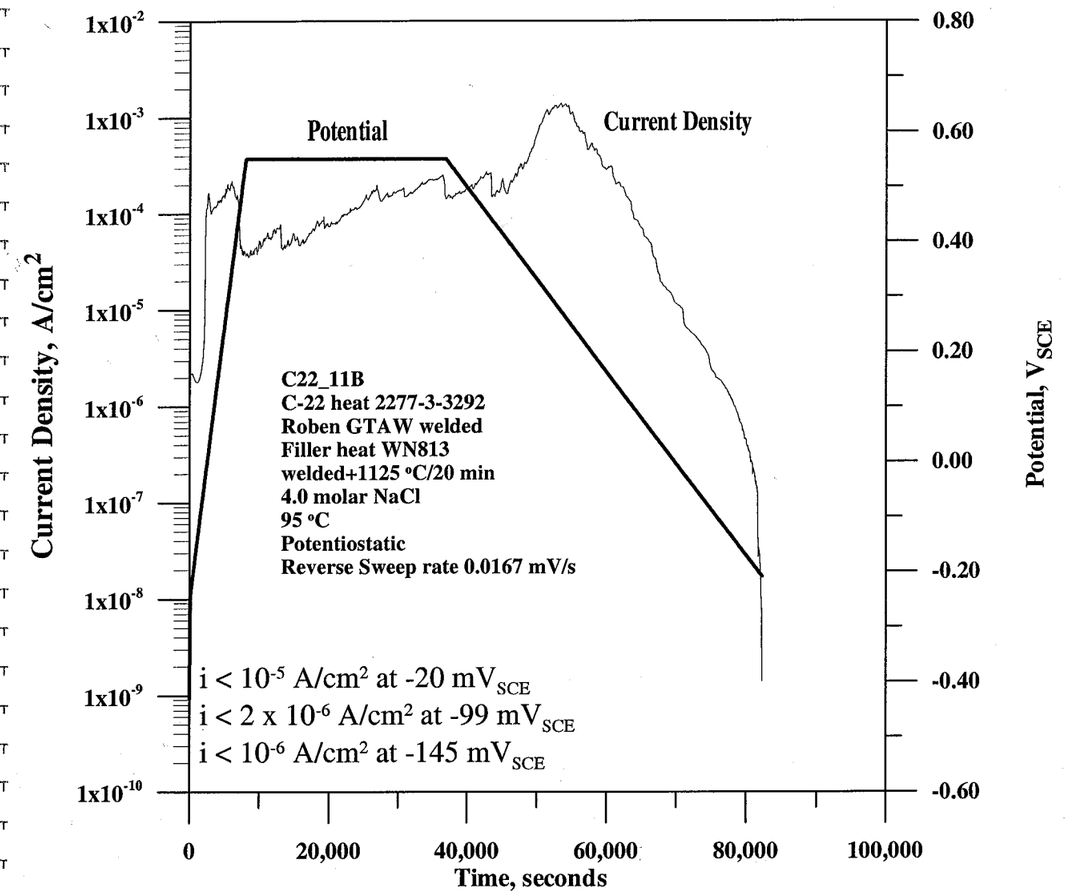

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3260~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 22.11038 g **Final Weight:** 21.98218 g	**Model:** Sartorius Genius **Cal:** 05/11/05	**SN:** 12809099 **Due:** 11/11/05
Solution: 4M NaCl 467.5 g NaCl Lot: 045904 + DI to 2L		
Reagents measured with	**Model:** OHAUS **Cal:** 1/14/05	**SN:** 2883 **Due:** 7/14/05
Initial pH: 8.2 **Final pH:** 7.5	**Model:** Orion EA 940 **Cal:**7/21/04 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/21/05 **SN:** 4079126
Test Temperature: 95° C	**Measured with Hg Thermometer** **Cal:** 5/06/05	**SN:** H98-182 **Due:** 5/05/06
Counter Electrode: Platinum Flag		
Reference Electrode: Fisher 13-620-51		**SN:** 7282317
Gas: 99.999% Nitrogen Gas		
Ecorr: −440 mV$_{SCE}$ **Ept:** −265 mV$_{SCE}$	**Model:** Keithley 617 **Cal:** 5/27/05	**SN:** 537418 **Due:** 11/25/05
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_12B

Number of Crevice Corrosion Sites: 12 /24 (24 max.)

Twelve crevice corrosion sites.
Mild surface staining.

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		Recorded by Steve Young	7/8/05

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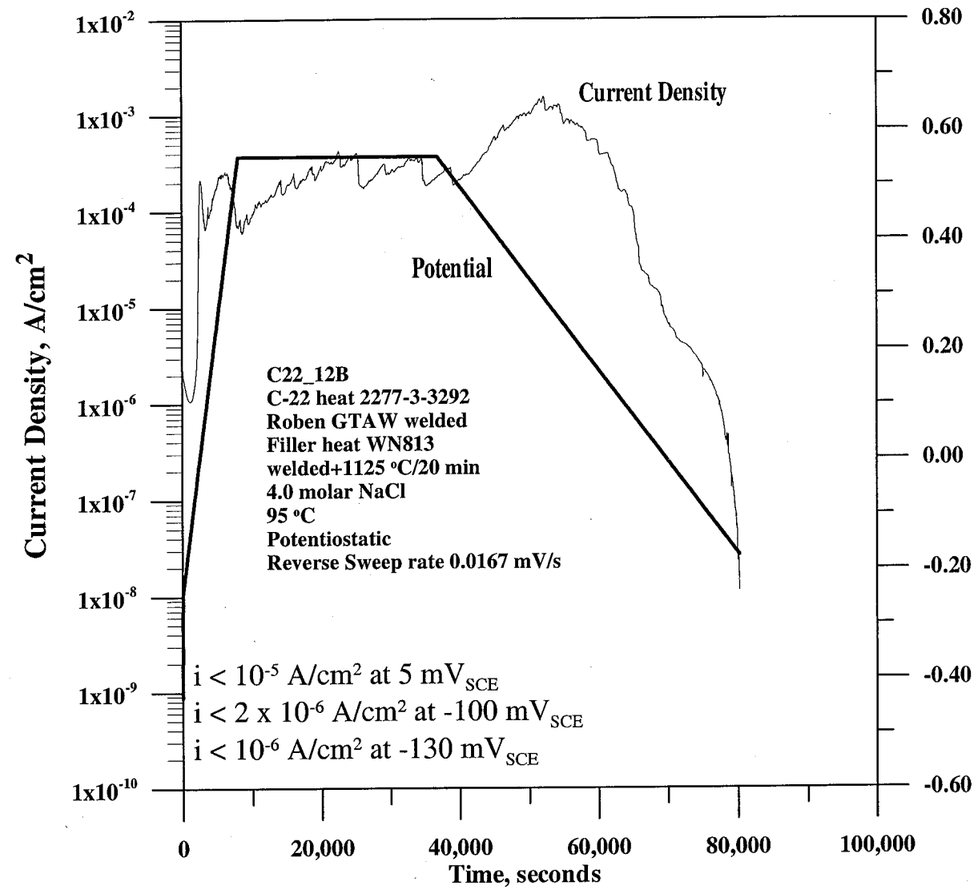

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		Recorded by Steve Young	7/21/05

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 58Y 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver:	Proto 6104 **Cal:** 4/11/05	**SN:** 139072 **Due:** 10/11/05
Initial Weight: 22.21953 g **Final Weight:** 22.21878 g	**Model:** Sartorius Genius **Cal:** 5/11/05	**SN:** 12809099 **Due:** 11/11/05
Solution: 0.5M NaCl 58.46g NaCl Lot: 045904 + DI to 2L		
Reagents measured with	**Model:** OHAUS **Cal:** 7/12/05	**SN:** 2883 **Due:** 1/12/06
Initial pH: 6.5 **Final pH:** 8.0	**Model:** Orion EA 940 **Cal:** 7/25/05 **pH Probe:** #13-620-296	**SN:** 2330 **Due:** 7/25/06 **SN:** 4079126
Test Temperature: 95°C	**Measured with Hg Thermometer** **Cal:** 10/14/04	**SN:** 323007 **Due:** 10/14/05
Counter Electrode: Platinum Flag		
Reference Electrode: Fisher 13-620-52		**SN:** 4028036
Gas: 99.999% Nitrogen Gas		
Ecorr: −526 mV$_{SCE}$ **Ept:** +75 mV$_{SCE}$	**Model:** Keithley 617 **Cal:** 5/27/05	**SN:** 537418 **Due:** 11/25/05
Potentiostat: Solartron 1480		**SN:** 00240551

DATA FILE: C22_12T2

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No crevice corrosion.

Mild surface staining.

* This was a repeat test of 12T (#32).

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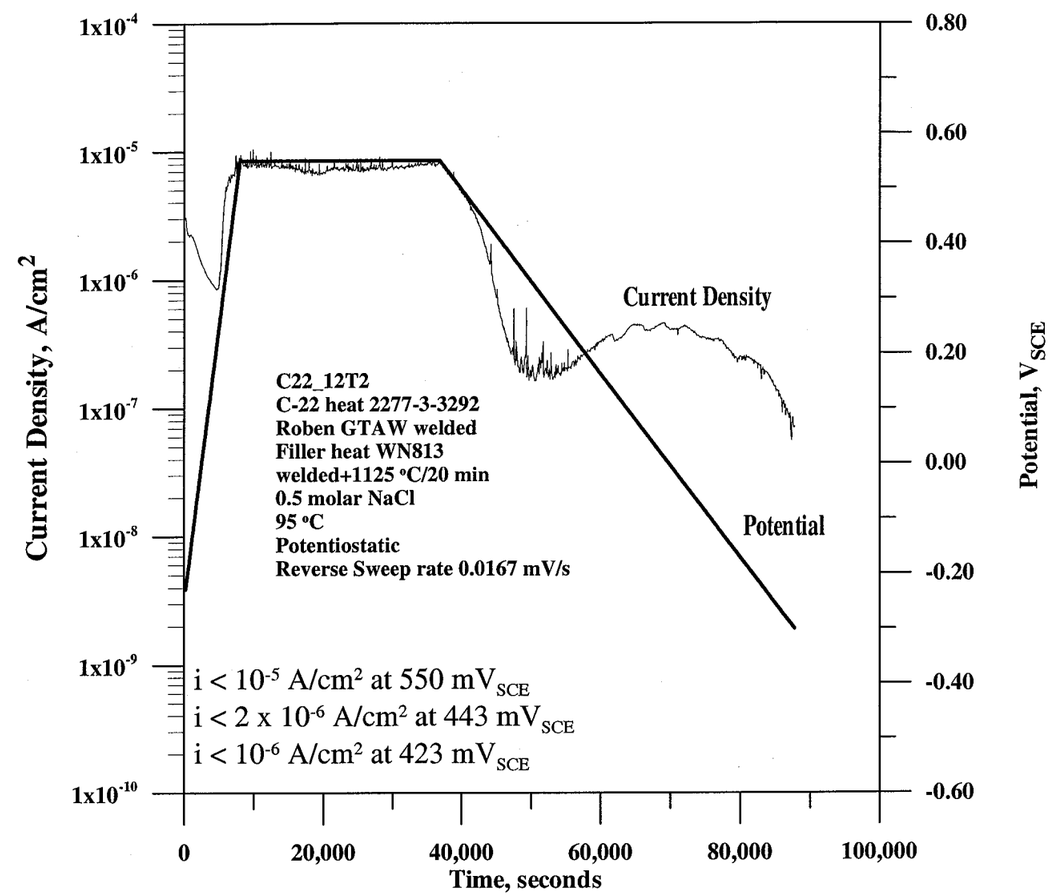

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POTENTIAL SCAN AND HOLD

Objective: Same as page 1.

Alloy / Heat No. : C-22 Heat# 2277-3-~~3266~~ 3292 SBY 10/5/05 #20.06002.01.322.002

Specimen Preparation: Specimen machined to dimensions specified in CNWRA Drawing. Specimen surfaces polished to 600 Grit finish using SiC paper. Specimen cleaned in acetone and rinsed in DI water. PTFE crevice forming washers attached to specimen using insulated C-276 hardware. Hardware Torgue to 50 in-oz.

Torque Screwdriver: Proto 6104 **SN:** 139072 **Cal:** 4/11/05 **Due:** 10/11/05

Initial Weight: 22.01032 g **Model:** Sartorius Genius **SN:** 12809099
Final Weight: 22.00898 g **Cal:** 05/11/05 **Due:** 11/11/05

Solution: 1M NaCl
11688 g NaCl Lot: 045904
+ DI to 1L

Reagents measured with **Model:** OHAUS **SN:** 2883 **Cal:** 7/12/05 **Due:** 1/12/06

Initial pH: 6.2 **Model:** Orion EA 940 **SN:** 2330
Final pH: 8.0 **Cal:** 7/25/05 **Due:** 7/25/06
pH Probe: #13-620-296 **SN:** 4079126

Test Temperature: 95°C **Measured with Hg Thermometer** **SN:** H98-182 **Cal:** 5/06/05 **Due:** 5/05/06

Counter Electrode: Platinum Flag

Reference Electrode: Fisher 13-620-51 **SN:** 7282317

Gas: 99.999% Nitrogen Gas

Ecorr: $-536\ mV_{SCE}$ **Model:** Keithley 617 **SN:** 537418
Ept: $+92\ mV_{SCE}$ **Cal:** 5/27/05 **Due:** 11/25/05

Potentiostat: Solartron 1480 **SN:** 00240551

DATA FILE: C22_12M2

Number of Crevice Corrosion Sites: 0 /24 (24 max.)

No corrosion sites.

Mild surface staining only.

* This was a repeat of test 12M (#34).

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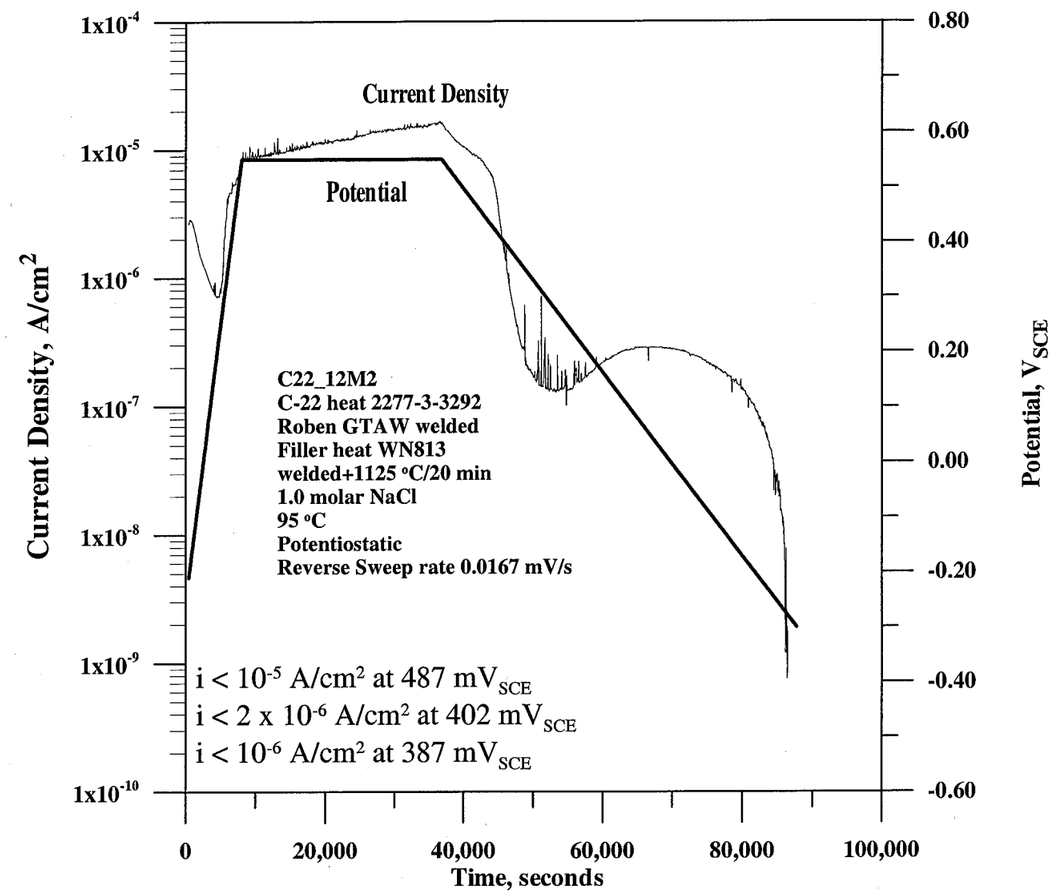

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Continuation Notebook 732

Y. Pan 8/22/05

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List of Publication Using Data from Scientific Notebook No. 712

Y.-M. Pan and D.S. Dunn. Postweld Heat Treatment to Improve Localized Corrosion Resistance of Alloy 22 High-Level Waste Container Weldments. Presentation at the Materials Science & Technology 2005 Conference, Pittsburgh, Pennsylvania, September 25–28, 2005.

I have reviewed this scientific notebook and find it in compliance with QAP-001. There is sufficient information regarding procedures used for conducting tests, acquiring and analyzing data so that another qualified individual could repeat the activity.

4/21/06