

308

Q200409230002

Scientific Notebook No. 577: Potentiostatic
Tests, Cyclic Polarization Test, Crevice
Repassivations Tests, Passive Current
Density Tests, Critical Pitting Temperature
Tests Critical Repassivations Temperature
Test (03/12/2003 through 08/15/2003)

LABORATORY NOTEBOOK

CNWRA/SwRI

CNWRA
CONTROLLED
COPY 577

NOTEBOOK NO. _____
ISSUED TO DARRELL DUNN *Darrell D DD*
ON _____ 20 _____
DEPARTMENT _____
RETURNED _____ 20 _____

Bi Derby - Brian K. Derby - BKD
Chung-Che Wu - Chung - Che Wu - CW

SCIENTIFIC NOTEBOOK COMPANY
2831 LAWRENCE AVENUE
STEVENSVILLE, MICHIGAN 49127
(800) 537-3028 - <http://www.snco.com>

TITLE _____

From Page No. _____

FROM NB 157 P 208

Initial Scientific notebook entry for corrosion resistant material potentiostatic and potentiodynamic polarization tests.

Title: Potentiostatic tests, cyclic polarization tests, crevice repassivation tests, passive current density tests, critical pitting temperature tests critical repassivation temperature tests.

Tests Performed by: Darrell S. Dunn

Objectives: Measure passive current densities, crevice repassivation potentials, critical pitting temperature and critical repassivation temperature for corrosion resistant candidate materials.

Equipment: EG&G Versastat Serial Number 20104. EG&G model 352 corrosion software. NEC 586 computer. Keithley Electrometer model 614 SN 555368 or equivalent. ASTM G-5 polarization cell, Large 2 L glass cells with Teflon tops, Electrochemical Impedance Spectroscopy system including Solartron 1260 FRA and Solartron 1287 Potentiostat. ESC 440 multichannel potentiostats with National instruments Labview data acquisition software or Strawberry Tree data acquisition software.

Materials: Alloy C-22, Alloy 825, Alloy 625 and Type 316 L stainless steel

Specimen specifications: Cylindrical CPP specimens 1.915" x 0.250" and Crevice repassivation specimens with Teflon crevice washers attached to surface.

Measurement Parameters: Current and Potential as described in TOP-008. Temperature of solution $\pm 2^{\circ}\text{C}$

Required level of accuracy: Potentials $\pm 5\text{mV}$. Current less than 0.1 microamp.

Uncertainty and Sources of Error: Current density calculated as current divided by sample area. Actual current density of corroding areas is not determined. Resolution limit of data acquisition systems may limit accuracy of passive current density measurements.

Copies from Notebook #157 App #541

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

[Signature]

3/12/03

From Page No. _____

Continued Testing From Notebooks # 366 - # 485 - # 526 - # 528
531 - # 541

Initial Scientific notebook entry for repassivation potential measurements

Title: Alloy 22 Repassivation Tests

Tests Performed by: Darrell S. Dunn, Letai Yang, Div 20; Brian Derby, Div. 18

Objectives: Determine the effect of thermal aging time and temperature on the localized corrosion susceptibility of Alloy 22.

Equipment: Laboratory oven for exposure of test specimens at 600 to 900 °C, Thermocouple and thermocouple meter. Keithley 614/617. Solartron 1287 Potentiostat and CorrView Software or equivalent, Electrochemical test cell.

Materials: Alloy C-22, heat 2277-8-3175. Other materials and heats to be added and identified prior to testing.

Specimen specifications: Specimens will be equivalent to 20.01402.571.006 unless otherwise specified.

Measurement Parameters: Temperature and time of exposure, Potential and Current of specimen during test.

Required level of accuracy: Temperature ± 2 °C, Time of exposure ± 1 minute, Potentials ± 1mV, Current ± 0.01 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.

Copies from All previous Notebooks

To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>B. K. D.</i>	3/12/03

TITLE _____

From Page No. _____ GALVANIC CORROSION TEST

DD 9/21/04

Objective: See pg # 1

Specimen: C-22 Alloy Crevice Specimen thermally aged 5min @ 870 °C (see pg # 83 no # 541) with 2 PTFE crevice washers attached at 50 In-C₂ Using Proto 6104 SN# 139072 cal 3/6/02 due 9/16/03
And A C-22 Alloy Plate Specimen

(Crevice Specimen)
Start wt: 40.84939g Santorous Genius SN# 12809099 cal 4/15/02
End wt: 40.84899g due 5/15/03

Solution: 4.0 M NaCl
467.56g NaCl Lot# 027878
+ DI Water To 2000 ml

pH Start: 8.764 Fisher Accumet 950 meter SN# 3340 cal 4/11/03
pH End: 2.917 pH probe # 13-620-296 SN# 1100208
pH Adjusted To 2.874 with 262ul of 20% HCl Solution # 062864

potentiostat: EG + G Versastat SN# 20104
Counter Electrode: Pt Flag for OC measurement Only
Reference: Fisher # 13-620-52 SN# 0245091
Temperature: 95 °C Hg Thermometer SN# 115858 cal 5/22/02 due 5/22/03

Solution Bubbled with Zero Air - Also Bubble In Vapor phase
Crevice Specimen Plate
Ecorr = -16 mV Ecorr = +134 mV
Ept = +251 mV Ept = +251 mV
Keithley 614 SN# 0704934 cal 5/20/02 due 5/20/03

Specimen Examination: No Crevice Corrosion on Crevice Specimen
No Corrosion on C-22 Plate - will be polished for both specimens for further testing

* Spiked Cell @ 9.374 E + 04 w/10ml NaOCl Lot# 027661-9 Exp 2/03 + 200ml Test Solution
Data NaOCl + 8

To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>B. K. D.</i>	3/14/03

From Page No. _____

Model 352/252 Corrosion Analysis Software, v. 2.30

Filename: a:naoclt8

Pstat: VStat[] Ver 2

GC GALVANIC CORROSION

Date Run: 12-21-02

File Status: NORMAL

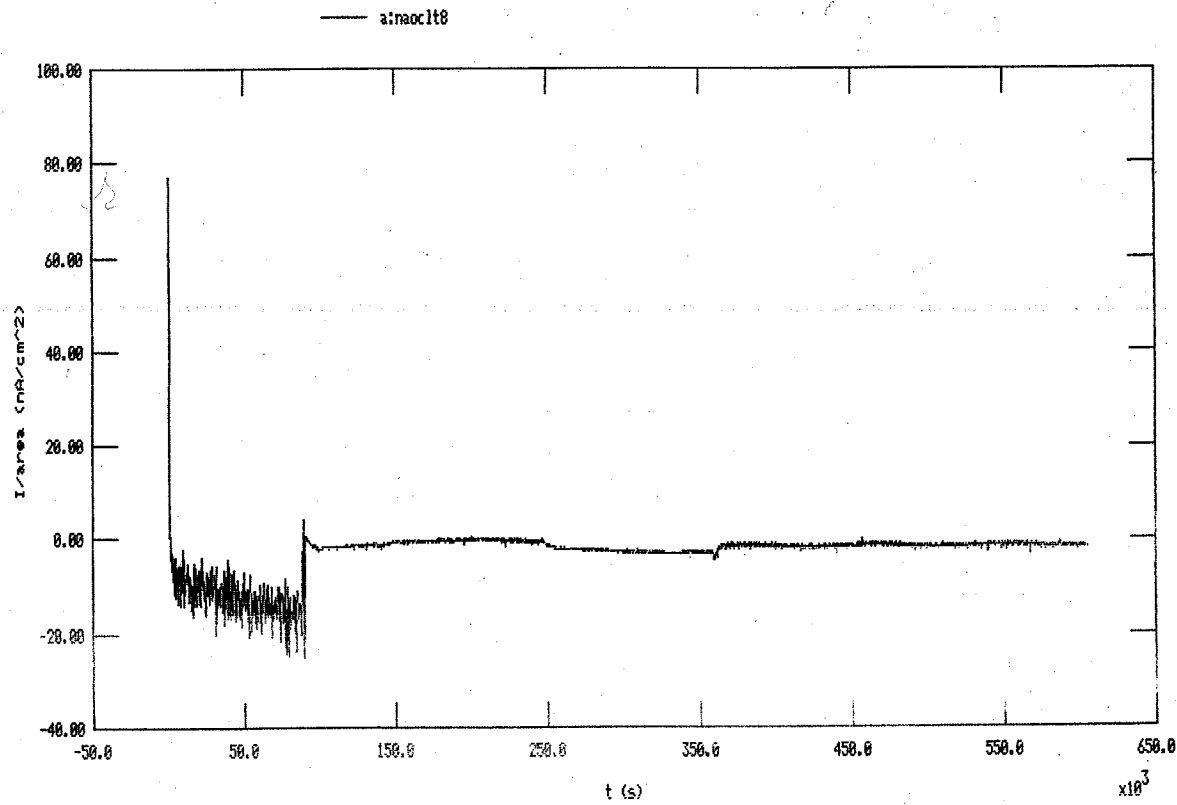
Time Run: 08:26:45

Time/Pt.	TP	336.0	s	Time Step 1	T1	604.8E3	s
No. of Points	NP	1800		Curr. Range	CR	Auto	
				Stop On	SO	Pass	

Line Sync.	LS	no	Filter	FL	Off
Rise Time	RT	high stability	Ref. Elec.	RE	SCE 241.5E-3V
Working Elec.	WE	Solid	Equiv. Wt.	EW	26.04 g
Sample Area	AR	15.00 cm ²	DEN	8.690E+00	g/ml
Density	DE	8.690	AUX A/D	AU	no
Open Circuit	OC	15.00E-3 V			

Comment: NaOClt8

Model 352/252 Corrosion Analysis Software, v. 2.30	Filename: a:naoclt8	Pstat: VStat[] Ver 2	GC GALVANIC CORROSION
File Status: NORMAL	Date Run: 12-21-02	Time Run: 08:26:45	
TP 3.360E+02	T1 6.048E+05	CR AUTO	NP 1800
RT HIGH STABILITY	REF 0.24150 SCE	WEK SOLID	SO Pass
DEN 8.690E+00	AU NO	OC 0.015	FL NONE
			EW 2.604E+01



To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

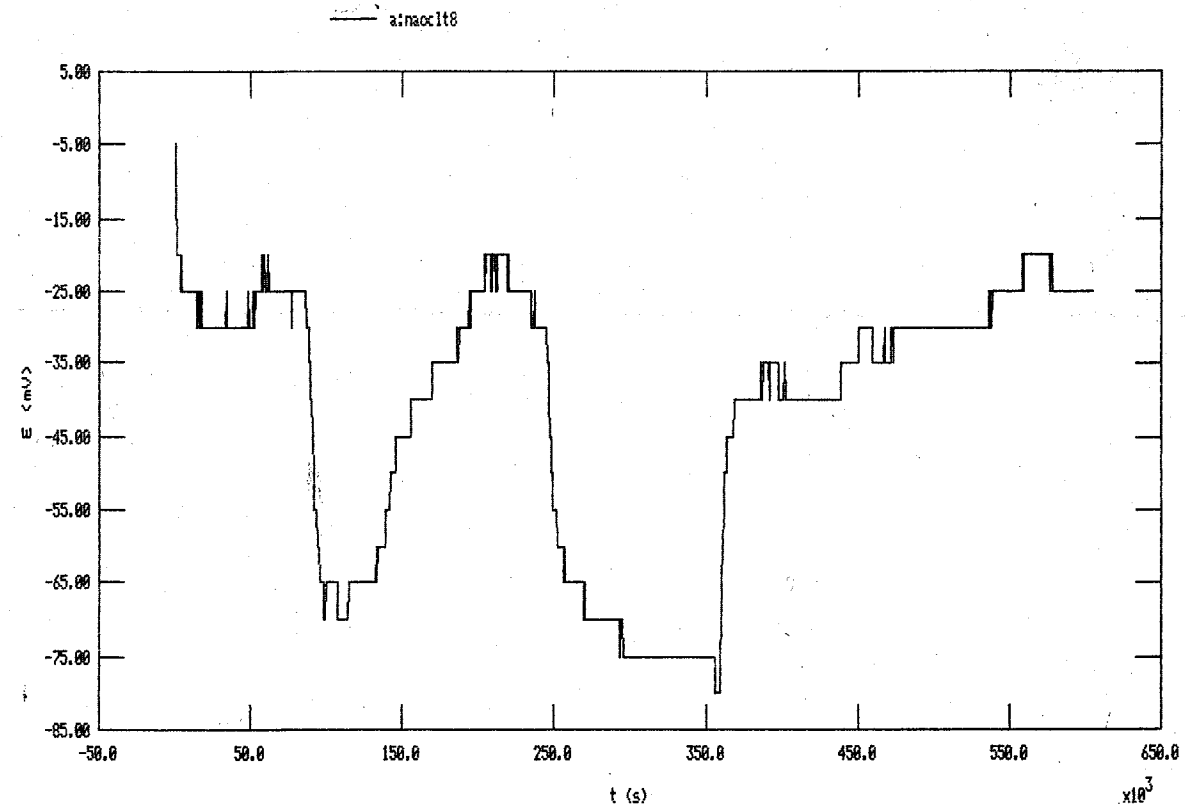
Date _____

Recorded by *[Signature]*

3/20/03

From Page No. _____

Model 352/252 Corrosion Analysis Software, v. 2.30	Filename: a:naoclt8	Pstat: VStat[] Ver 2	GC GALVANIC CORROSION
File Status: NORMAL	Date Run: 12-21-02	Time Run: 08:26:45	
TP 3.360E+02	T1 6.048E+05	CR AUTO	NP 1800
RT HIGH STABILITY	REF 0.24150 SCE	WEK SOLID	SO Pass
DEN 8.690E+00	AU NO	OC 0.015	FL NONE
			EW 2.604E+01



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Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by *[Signature]*

3/20/03

From Page No. _____ Galvanic Corrosion Test

Objective: See pg #1 1 DD 9/21/04

Specimen: C-22 Alloy Crevice Specimen thermally Aged 5m @ 870°C
(See pg #83 NS #541) with 2 PTFE Crevice Washers Attached At 50 In. Oz
Using Proto 6104 SN# 139072 cal 3/6/03 Due 9/6/03
And A C-22 Alloy Plate Specimen

(Crevice Specimen)
Start wt: 40.83475g Satorious Genius SN# 12909099 cal 11/15/02
End wt: 40.83417g Due 5/13/03

Solution: 4.0 m NaCl
467.63g NaCl lot # 027878
+ O2 water to 2000mls

pH start = 8.724 Fisher Argument 950 meter SN# 3340 cal 6/17/02 due 2/1/03
pH End = 2.925 pH probe # 13-620-246 SN# 1100206
pH Adjusted to 2.884 with 158 µl of 20% HCl Solution # 062561

Potentiostat: EG & G Versastat SN# 20104
Counter Electrode: Pt Flay for DC measurement Only
Reference: Fisher # 13-620-52 SN# 0249091
Temperature: 95°C Hg Thermometer SN# 115858 cal 5/22/02 due 5/22/03

Solution Bubbles with Zero Air - Also bubbles in Vapor phase
(Crevice Specimen) (Plate)

E_{corr} = -27mV E_{corr} = -128mV
E_{pt} = +127mV E_{pt} = +127mV
Keithley 614 SN# 0764934 cal 5/21/02 Due 5/20/03

Specimen Examination: No sign of Any Crevice Corrosion 1/4 feet of
Crevice Washers - No staining on Specimen
* Will Repolish for further Testing
* Note: Added 15ml NaOCl lot # 027664-9 Exp 8/03 + 2000mls Test Solution
9.240 E104 Data NaOCl+9 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	3/26/03

From Page No. _____

Model 352/252 Corrosion Analysis Software, v. 2.30
 Filename: a:naoclt9
 Pstat: VStat[] Ver 2
 GC GALVANIC CORROSION
 Date Run: 12-23-02
 File Status: NORMAL
 Time Run: 08:32:21

Time/Pt.	TP	336.0	s	Time Step 1	T1	684.8E3	s
No. of Points	NP	1800		Curr. Range	CR	Auto	
				Stop On	SO	Pass	

Line Sync. LS no
 Rise Time RT high stability
 Working Elec. WE Solid
 Sample Area AR 15.00 cm²
 Density DE 8.690 g/ml
 Open Circuit OC -47.00E-3 V

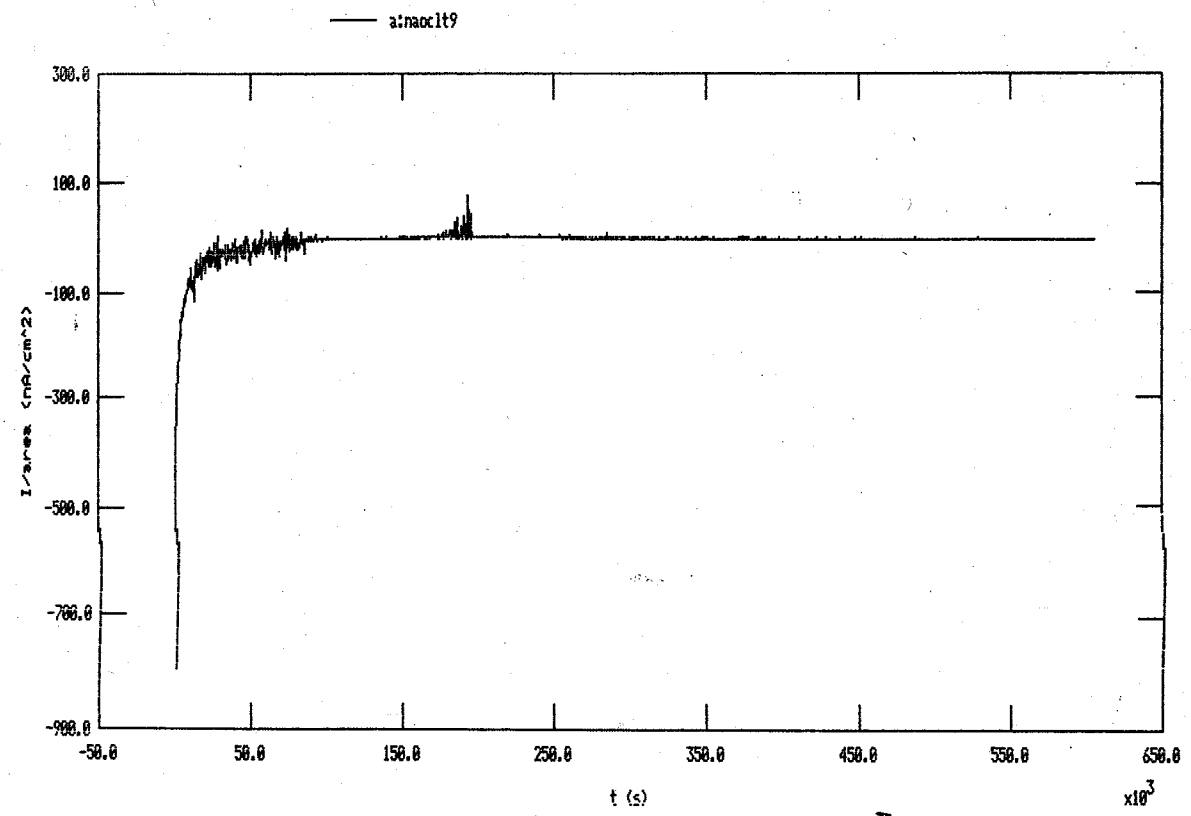
Filter FL Off
 Ref. Elec. RE SCE 241.5E-3V
 Equiv. Wt. EM 26.04 g
 AUX A/D AU no

Comment: NaOCl+9

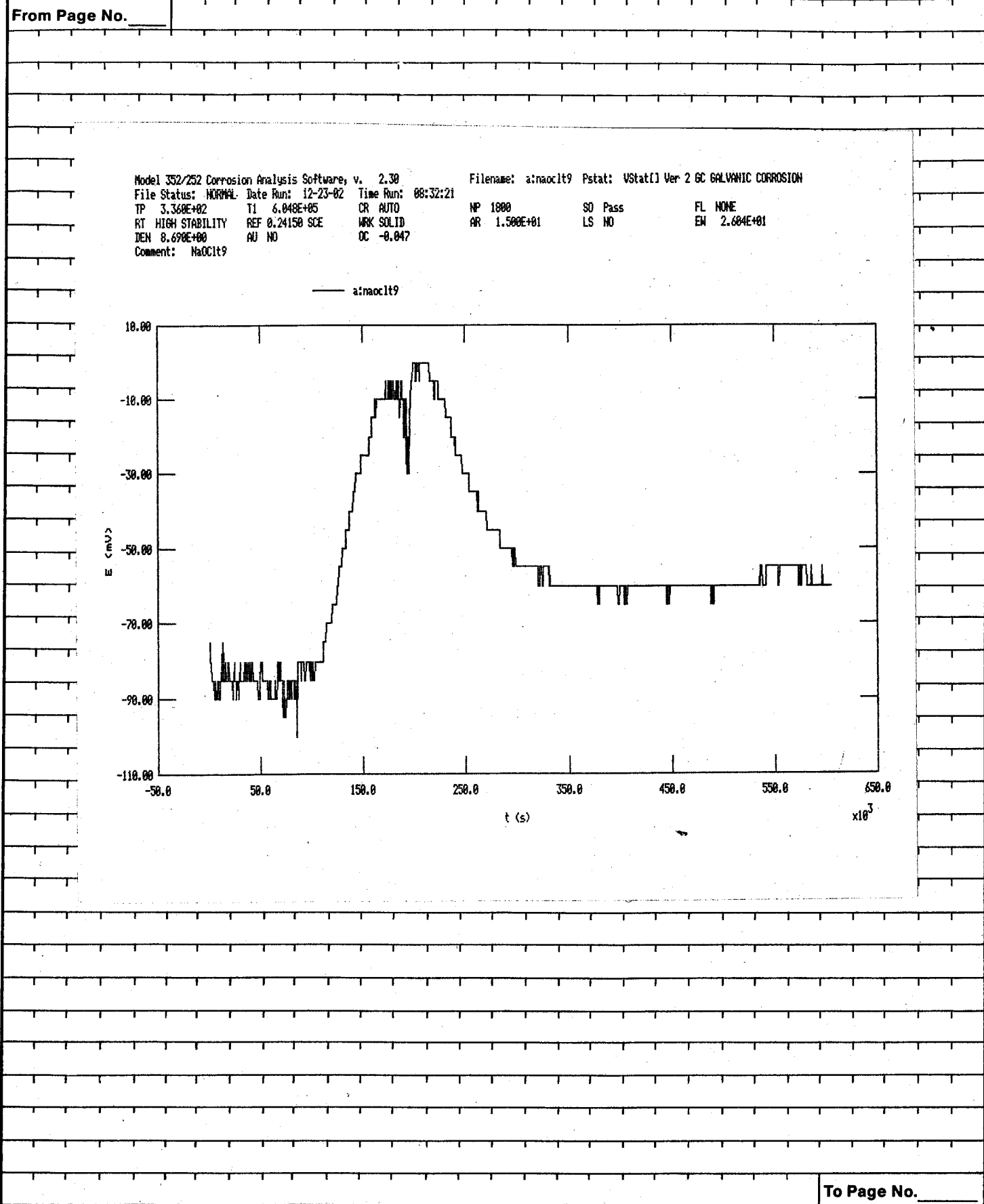
Model 352/252 Corrosion Analysis Software, v. 2.30
 File Status: NORMAL Date Run: 12-23-02 Time Run: 08:32:21
 TP 3.368E+02 T1 6.848E+05 CR AUTO
 RT HIGH STABILITY REF 0.24150 SCE WRK SOLID
 DEN 8.690E+00 AU NO OC -0.047

NP	1800	SO	Pass	FL	NONE
AR	1.500E+01	LS	NO	EM	2.604E+01

Comment: NaOCl+9



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	4/1/03



Witnessed & Understood by me, _____ Date _____
Invented by _____ Date 4/1/03
Recorded by *B-E*

From Page No. _____ Galvanic Corrosion Test

Objective: See pg # 1 DD 9/21/04

Specimen: C-22 Alloy Crevice Specimen - thermally aged 5min @ 870°C
(See pg # 83 NB # 541) with 2 PTFE Crevice Specimen Washers Attached AT
50 In-Oz Using Photo 6104 SN# 139072 cal 3/16/03 due 9/6/03
And A C-22 Alloy Plate Specimen

(Crevice Specimen)
Start wt = 40.8123g Satorious Gravim SN# 12509099 cal 11/15/02 due 5/5/03
End wt = 40.8137g

Solution: 4.0 M NaCl
467.56g NaCl lot # 027525
+ DI Water To 2000ml

pH Start: 8.522 Fisher Assmet 950 meter SN# 3346 cal 8/1/02 due 8/7/02
pH End 2.978 pH probe 13-620-296 SN# 2291257 P6
pH Adjusted To 3.001 with 210ul of 20% HCl Solution Lot # 012561

potentiostat: EG & G Versastat SN# 20104
Counter Electrode: Pt Flag for DC measurement only
Reference: Fisher # 13-620-52 SN# 2299091
Temperature: 95°C Hg Thermometer SN# 115855 cal 5/22/02 due 5/22/03

Solution Bubbles with zero Air - Also Bubbles In Vapor phase

(Crevice Specimen) (Plate)
E_{corr} = -77mV E_{corr} = +32mV Kentsley 614 SN# 0704974
E_{PT} = +167mV E_{PT} = +167mV cal 5/20/02 due 5/20/03

Specimen Examination: No Sign of Crevice Corrosion 24 feet of Crevice
washer - Very Mild Surface staining -
* Will Re-polish for further Testing
Added 20ul NaOH lot # 027461-9 Exp 8/03 + 200ul Test Solution @ 1.841E+05
* Corrosion Washes At End of Testing Data Lost

DATA NaOClt16

To Page No. _____

Witnessed & Understood by me, _____ Date _____
Invented by _____ Date 4/2/03
Recorded by *B-E*

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same As #2

Specimen: Alloy C-22 2277-8-3175 polished to A 600 Grit Finish with 2 PTFE Creevice Washers Attached At 50 In. Oz Using Proto #6104 SN# 139072 cal 3/6/03 pur 8/7/03 ^{4/29/03} 9/6/03

Start wt = 40.7569g Sartorius Genius SN# 12809099 cal 11/15/02 pur 5/15/03
End wt = 40.7934g

Solution: 0.028 M NaCl + 0.01 M Na₂S₂O₃
3.274g NaCl lot# 027878
1.583g Na₂S₂O₃ lot# 923931A
+ DI water to 2000 ml

pH Start: 6.731 Fisher Analyt 850 meter SN# 3340 cal 8/7/02 pur 8/7/02
pH End: 7.383 pH probe # 13-620-296 SN# 2291257 PL

Potentiostat = EG & G model # 273 SN# 10120

Counter Electrode: Pt Flay

Reference: Fisher 13-620-52 SN# 0251435

Temperature = 95°C Mg Thermometer SN# 00-387 cal 5/10/02 pur 5/14/03

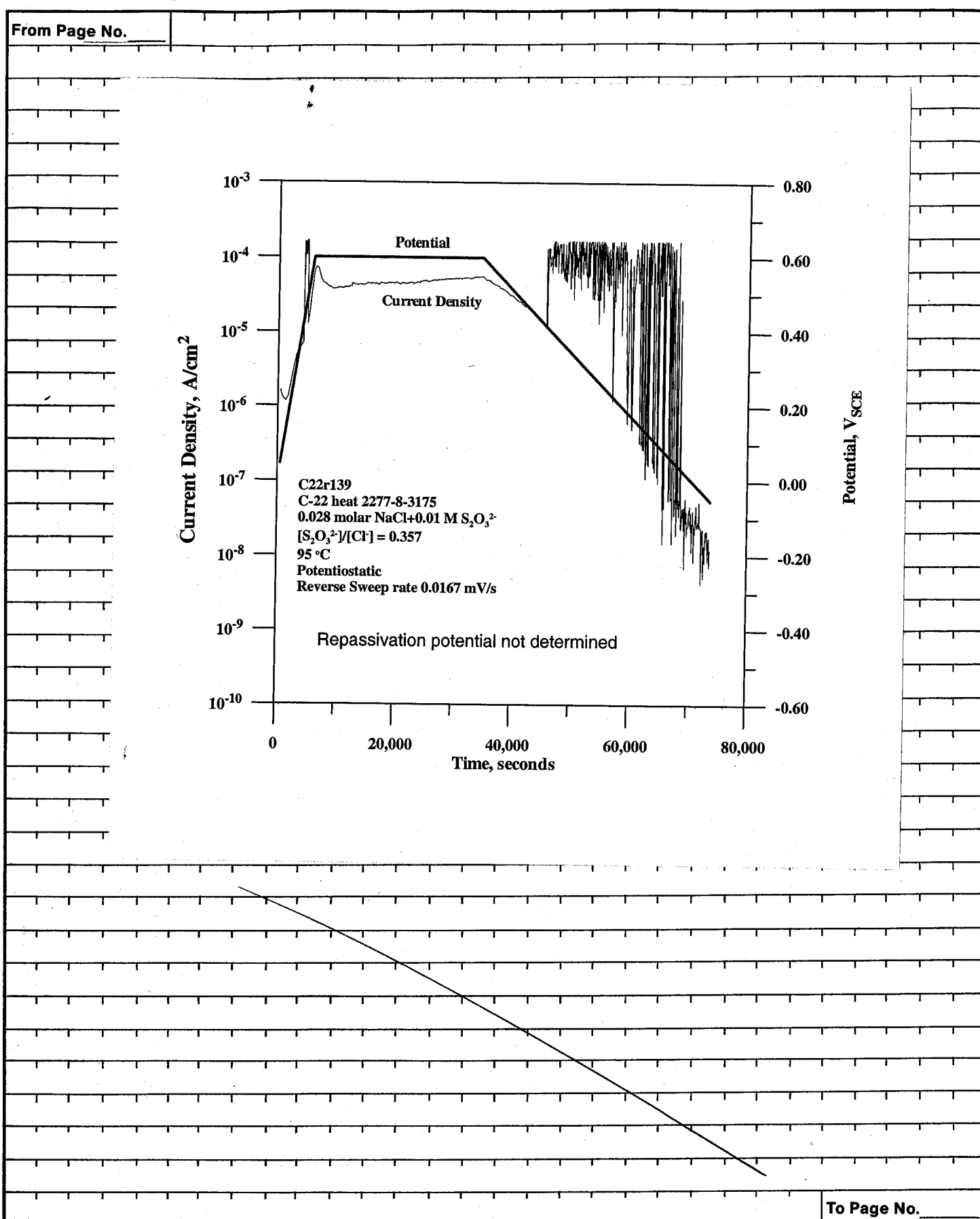
E_{corr} = -416 mV Keithley 614 SN# 0704934 cal 5/26/02 pur 5/26/03
E_{pt} = -165 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: No Creevice Corrosion 1/24 feet of Creevice Washer
Dull tint staining on All Surfaces of Specimen

Data C222139 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	4/24/03
		<i>[Signature]</i>	



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	4/29/03
		<i>[Signature]</i>	

From Page No. _____

PURCHASING
REGISTRATION OR PREVIOUS SUPPLIER: **SOUTHWEST RESEARCH INSTITUTE,™**
REGISTERED OR PREVIOUS SUPPLIER: **Texas Toolmakers**
CITY/STATE: **11411 Coker Loop**
CITY: **Mike Ridgway**
PHONE: **210/494-3651**
FAX: **210/4946139**

REQUISITION DATE: **03/03/03** PURCHASE ORDER NUMBER: **632625**
DELIVERY TO: **D. Dunn/Bldg. 57**
SHIP VIA: _____
PURCHASING SELECTED SUPPLIER: _____
SUPPLIER CODE: _____
PHONE: _____
FAX: _____

LN.	QTY.	UNIT	DESCRIPTION	ORG	PROJECT	ACCT	%	DATE REQUIRED	EST. UNIT PRICE
A.	20	ea.	Crevice corrosion test specimens 20-1402-571-027 Machined from Alloy 22 plate.	20	96002.01	081	100	03/28/03	\$149.50

Attached Quote and CNWRA Drawing 20-01402-571-027
Quality and Technical Requirements:
Specimens machined as per CNWRA drawing
20-01402-571-027.
Dimensional inspection per dimensions and
tolerances identified in CNWRA Drawing 20-01402-571-027 is required.
Specimens should be cut from plate using a wire EDM or
other method that conserves material.

"Quality Affecting Purchase"
Material Supplied by SwRI

INTERNAL NOTES TO BUYER: _____
SPECIAL INSTRUCTIONS TO SUPPLIER: _____

1. Government Property? YES NO
IF YES, CHECK THE APPROPRIATE PROPERTY TYPE (SEE BACK FOR EXPLANATION OF PROP. ENTRY TYPES)
a. G-1 CONSUMABLE
b. G-4 DELIVERABLE
c. G-3 ACCOUNTABLE/REPORTABLE
d. G-5 GOVT. PROPERTY BEING SENT TO SUPPLIER
 YES NO
CONTRACT REVIEW APPROVAL

2. QUALITY ASSURANCE? YES NO
a. ASL REQUIRED? YES NO
b. G-1 CODES: **Q20, Q12**
c. INSPECTION CRITERIA: **AT to inspect per QAP. Q12.**
d. ON APPROVAL (IF REQUIRED): **D. Dunn 7/5/02**
DATE

3. SOURCING NOTES
IF YOU HAVE SELECTED A BRAND NAME OR PARTICULAR MANUFACTURER, WOULD AN EQUIVALENT BRAND OR PRODUCT ALSO SATISFY YOUR NEED? YES NO
IF YOU HAVE SUBMITTED A SUPPLIER, AND NO OTHER SUPPLIER WILL MEET YOUR NEEDS, PLEASE ATTACH A MEMO OF EXPLANATION.
REQUESTOR'S SIGNATURE: _____ EXT. NO.: **6090**
DATE: **3/3/03**
DATE: _____
DATE: _____
ADMIN. APPROVAL: _____

4. REPAIRS
a. IS THIS REQ. FOR A REPAIR? YES NO
b. IS THE REPAIR ON OR OFF CAMPUS? ON OFF
c. IF OFF CAMPUS PROVIDE SHIPPING TICKET NO. _____

TOTAL

Witnessed & Understood by me, _____ Date _____
Invented by _____ Date _____
Recorded by *[Signature]* Date **4/30/03**

From Page No. _____

Darrell S. Dunn
SwRI-CNWRA
Phone: (210) 522-6090
Fax: (210) 522-5184
e-mail: ddunn@swri.org

CNWRA Drawing 20-01402-571-027
Dimensional tolerances +/-0.005"
unless otherwise specified
16 rms surface finish
Crevice Repassivation Specimen

To be completed at time of order:
Material: Alloy C-22
Heat: 2277-8-3175
Specimen Orientation: _____
Other: _____

Initiated by: *[Signature]* Date **7/5/02**
Reviewed by: *[Signature]* Date **7/5/02**
QA Approval: *[Signature]* Date **7/5/02**

Witnessed & Understood by me, _____ Date _____
Invented by _____ Date _____
Recorded by *[Signature]* Date **4/30/03**

From Page No. _____

TEXAS TOOLMAKERS, INC.
11411 East Coker Loop
San Antonio, TX 78216
Phone: 210-494-3651
Fax: 210-494-6139

PACKLIST
Packlist ID: D00296
Date: 04/24/2003 12.0
Page: 1

Sold To Address		Ship To Address	
SOUTHWEST RESEARCH INSTITUTE 6220 CULEBRA ROAD SAN ANTONIO, TX 78228		SOUTHWEST RESEARCH INSTITUTE 6220 CULEBRA ROAD SAN ANTONIO, TX 78228 BLDG. 57	

DARRELL DUNN

CUSTOMER ID 1111	CUSTOMER PO 383229S	PAYMENT TERMS 0.5%/10 days, Net 30	F.O.B. TTI-ORIGIN
SALES REP ID MIKE	SHIPPING METHOD TTI TRUCK	SHIP DATE 4/24/2003	OUR ORDER NUMBER 34360
QUANTITY	ORD	SHP	BCK
20	20	0	20-01402-571-027
CREVICE CORROSION TEST SPECIME 34360/1			PART ID 34360/1

OUR WORK ORDER NO. _____

RECEIVED BY: *Darrell Dunn* DATE: *04/27/03*


*1 Box
DO NOT
SEE*


To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		<i>Darrell Dunn</i>	<i>4/30/03</i>
		Recorded by	
		<i>Darrell Dunn</i>	

From Page No. _____

11411 East Coker Loop
San Antonio, Texas 78216
(210) 494-3651 * Fax (210) 494-6139
www.texastoolmakers.com



A8306  ISO 9002

CERTIFICATE OF CONFORMANCE

TO: Southwest Research Institute
6220 Culebra Road
San Antonio, Tx. 78238-5166

CUSTOMER P.O. 383229S

TTI JOB #: 34360

DESCRIPTION 20 EA.; P/N 20-01402-571-027 Crevice Repassivation Specimen

WE CERTIFY THAT THE ITEM(S) ON THE ABOVE REFERENCED PURCHASE ORDER HAVE BEEN PROCESSED AND/OR MANUFACTURED IN ACCORDANCE WITH:

Drawing

RECORDS ARE ON FILE AT THIS FACILITY, WHICH VERIFY OUR PROCESS CONTROLS, AND AVAILABLE FOR REVIEW UPON REQUEST. TEST RESULTS ARE AS FOLLOWS:

Accepted

TEXAS TOOLMAKERS,

BY : *Steven Espinoza* (Steven Espinoza)

TITLE: Q.C. Inspector

DATE: 4/24/03

To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		<i>Darrell Dunn</i>	<i>4/30/03</i>
		Recorded by	
		<i>Darrell Dunn</i>	

From Page No. _____

DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 34360/1 Part No.: 20-01402-571-027 Rev. No.: - P.O. No.: 3832295
 Customer: SWRI Part Name: Crevice Repassivation Specimen Log No.: 3066002-C

Inspection Plan:
 100 % Specified Dim. 1st Article
 Quantity: 20 Sample Size: 20 Accept No.: 20 Reject No.: 0 NR No.: 0

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.298-.300	TTL 204	
2	#5-40 Thd ∇ .250		#5-40 Thd ∇ .250	TTL gage & 204	
3	.325		.325	TTL 103	
4	.375		.374-.375	TTL 204	
5	.750		.750	TTL 204	
6	.375		.375	TTL 204	
7	.750		.750-.751	TTL 204	
8	.750		.750-.752	TTL 204	
9	Min. .020 R.		.032 R	TTL 024	
10	Plate Thickness		.4995-.502	TTL 204	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: [Signature] Date: 4/24/03
 Customer (as applicable): [Signature] Date: 4/28/03

TTI Form QF-100201

Rev 2

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

[Signature]

4/30/03

From Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

[Signature]

6/2/03

To Page No. _____

From Page No. _____

Galvanic Corrosion Test

Objective: See pg. # 1

Specimen: C-22 Alloy Crevice Specimen - Thermally Aged 5 min @ 870°C
 (See pg. # 83 NB # 541) with 2 PTFE Crevice Washers Attached At 50 In-Oz
 using Photo 6104 SN# 139072 cal 3/6/03 due 9/6/03 - Ann A C-22 plate specimen
 (Crevice Specimen)
 Start wt: 40.81207g Sandorvus Genius SN# 12809099 cal 5/15/03 due 11/15/03
 End wt: 40.81189g

Solution: 4.0 M NaCl
 467.58g NaCl lot # 027878
 + DI water to 2000mls

pH Start: 8.702 Fisher Accumet 950 SN# 3340 cal 5/7/02 due 8/7/03
 pH End: 3.071 pH probe 13-620-296 SN# 2291257 Pb
 pH Adjuster To 3.015 w/ 32ml 6M HCl lot # 023844

Potentiostat: EG & G model # 263 SN# 66105
 Counter Electrode: Pt Flay for OC measurement Only
 Reference: Fisher # 13-620-52 SN# 0249091
 Temperature: 95°C Hg thermometer SN# F98-393 cal 2/11/03 due 8/11/03

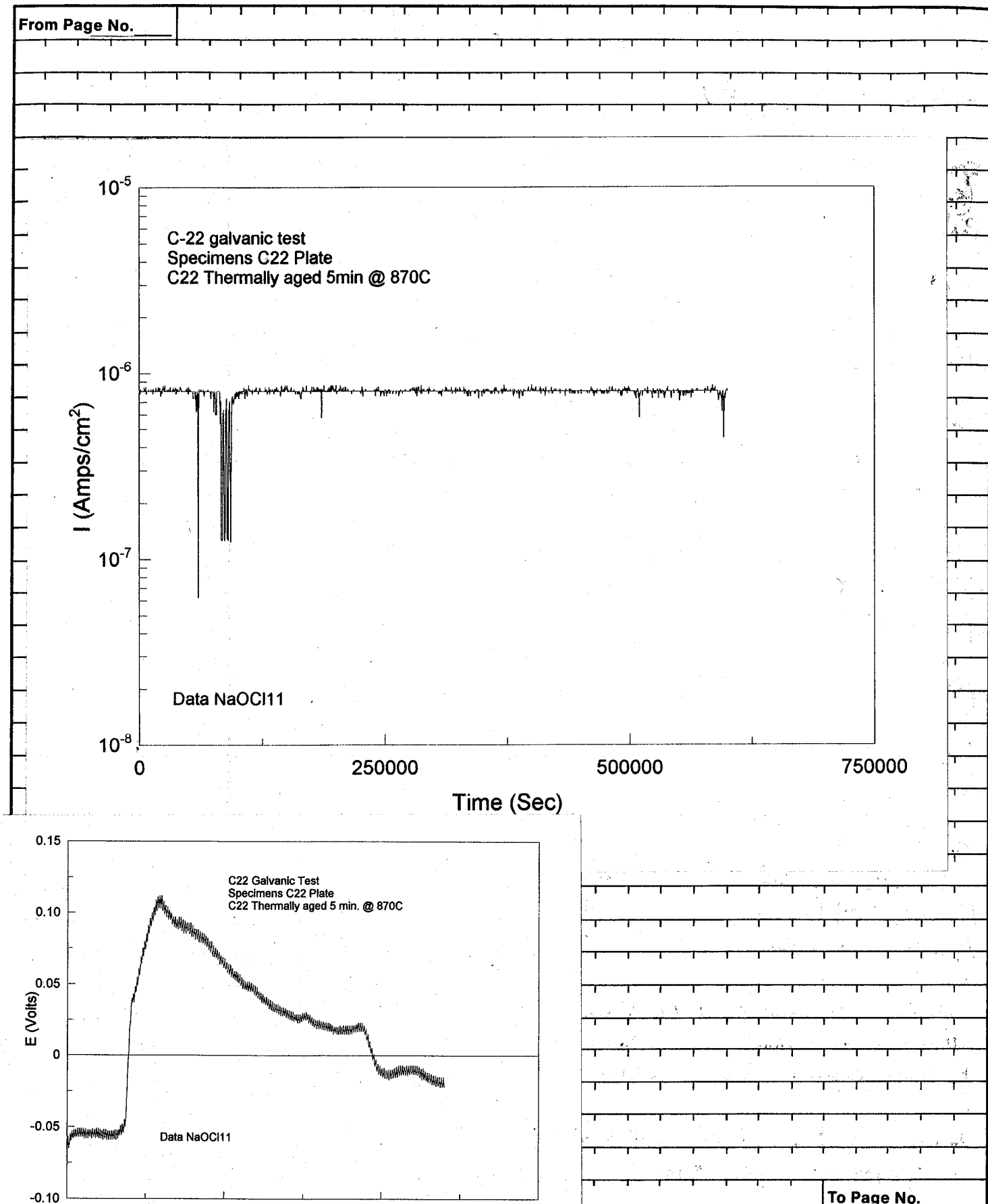
Solution Bubbles with zero Air - Also bubbles in Vapor phase of cell
 (Crevice) (plate)

From = -19 mV +52 mV Keithley 617 SN# 537418
 End = +324 mV +324 mV cal 4-2-03 due 10-2-03

Specimen Examination: No sign of crevice corrosion 1/4 inch of crevice washer
 very mild surface staining
 * will Repolish for further testing *

Added 20ml of NaCl lot # 027661-9 Exp. 8/03 + 200 mls of Test Solution
 @ 85560 sec - 856 points

Witnessed & Understood by me, _____ Date _____
 Invented by _____ Date _____
 Recorded by *B. J. [Signature]* Date 6/3/03



Recorded by *B. J. [Signature]* Date 6/3/03

From Page No. _____ Galvanic Corrosion Test

Objective: See pg #1

Specimen: C-22 Alloy Crevice Specimen - Thermally Aged 5 min @ 870°C
(See pg #83 N#541) with 2 PTFE Crevice Washers Attached At 50 In-Oz Using
Part #6104 SN#139072 cal 6/6/03 due 9/6/03 App A C-22 Alloy Plate Specimen
(Crevice Specimen)

Start wt: 40.7775g Santaricus Genius SN#12909099 cal 5/15/03 due 11/15/03
End wt: 40.77653g

Solution: 4.0 M NaCl
467.6g NaCl lot# 030192
+ DI water To 2000 ml

pH Start = 7.691 Fisher Accumet 950 SN#3390 cal 8/7/02 due 8/7/03
pH End = 3.143 pH probe 13-620-296 SN#2291257 PL
pH Adjusted To 3.065 with 32 µl of 6M HCl solution lot# 023844

Potentiostat: EG & G Versastat ^{24P} 6100 Model #263 SN#66105
Counter Electrode: Pt Flag for OC Measurement only
Reference: Fisher 13-620-52 SN#0249091
Temperature: 95°C Mg Thermometer SN#778-393 cal 2/1/03 due 8/1/03

Solution Bubbled with Zear Air - Also bubbled in Vapor phase
(Crevice Specimen) (Plate)

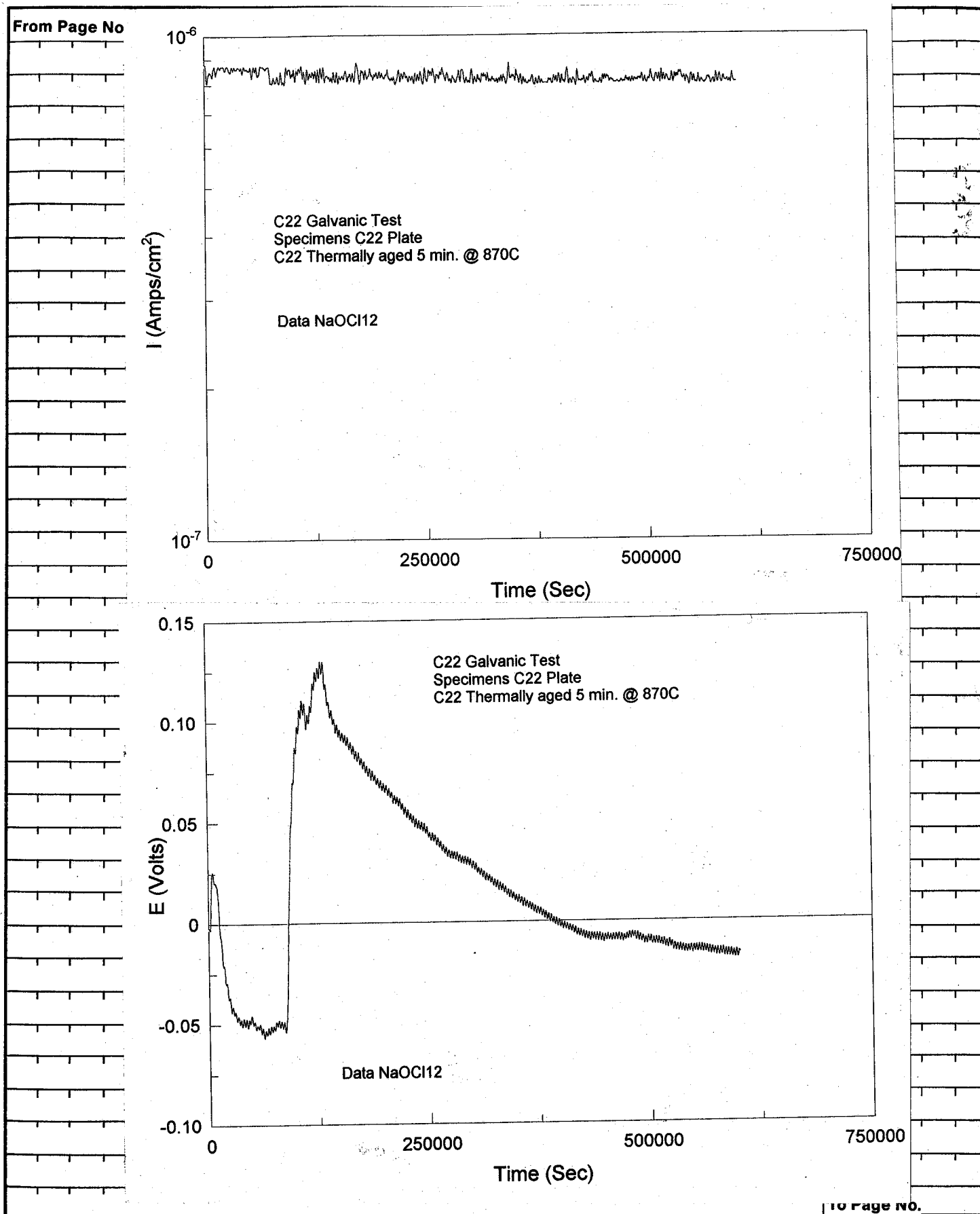
Espr: -19mV +52 Kerthley 617 SN#537415
Ept: +228mV +228mV cal 4/2/03 due 10/2/03

Specimen Examination: No Crevice Corrosion 1/24 part of Crevice Washer
Mild surface staining on Specimen
* will Repolish for further Testing

Added 25 µl of NaOCl lot# 027661-9 Exp 8/03 with 200mls Test solution
@ 78900 sec point #790

Data NaOCl 12

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	6/8/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	6/12/03

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same As pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished To A 600 Grit Finish
with 2 PTFE Crevice Washers Attached At 50 In-Oz
Using Proto #6104 SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.16311 g Sartorius Genius SN# 12809099 Cal 5/15/03
End wt.: 40.16271 g Due 11/15/03

Solution: 4 M NaCl + 1.0 M NaNO₃
467.52 g NaCl Lot# 027168
169.98 g NaNO₃ Lot# 020809
+ DI water to 2000 mL

pH start: 7.773 Fisher Accumet 950 meter SN 3340 Cal 8/7/02 Due 8/7/03
pH end: ~~7.53~~ 7.574 pH Probe #13-620-296 SN# 2291257 P6

Potentiostat: EG&G Model #273 SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 60°C Hg Thermometer SN# A2000-123 Cal: Mar 27, 03 Due: Sep 27, 03

E_{corr} = -0.2219 V Keithley 614 SN# 467374 Cal: 10/28/02 Due: 10/28/03
E_{pt} = +0.2136 V

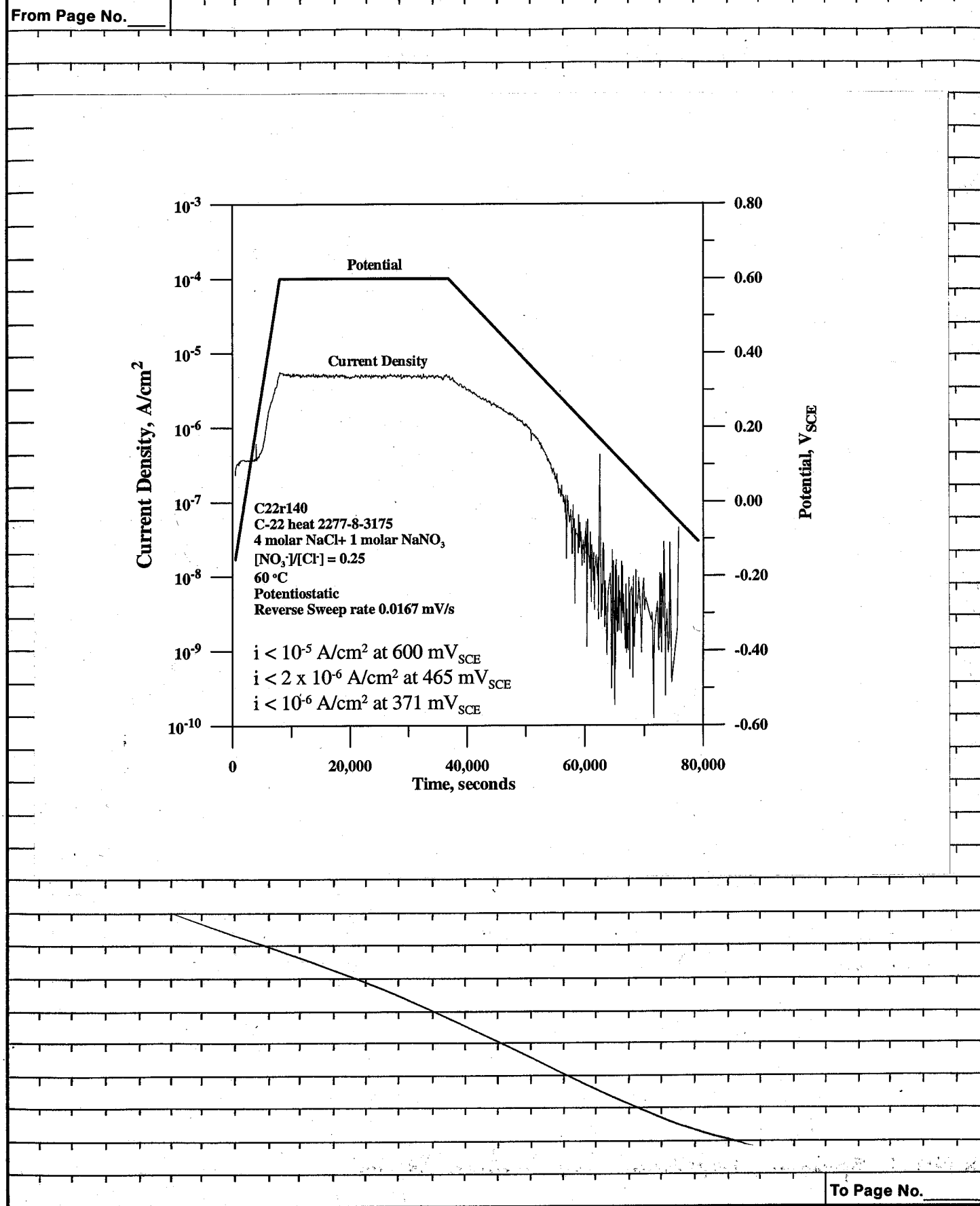
Solution Deaerated with 99.999% N₂

Specimen Examination: No sign of crevice corrosion. 1/4 feet of crevice washer. Mild surface stain.

*Note: Specimen Repolished for Further Testing

Data: C22R140

Witnessed & Understood by me,	Date	Invented by	Date	
		Recorded by <i>Ching-De Wu</i>	7/2/03	



Witnessed & Understood by me,	Date	Invented by	Date	
		Recorded by <i>Ching-De Wu</i>	7/8/03	

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 polished to a 600 Grit ^{7/2/03} ~~Fisher~~ ^{CW} Finish with 2 PTFE Crevice Washers Attached at 50 In-oz using Proto #6104 SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 39.96486 g Sartorius Genius SN# 12809099 Cal 5/15/03
End wt.: 39.96439 g Due 11/15/03

Solution: 4M NaCl + 0.5M NaNO₃
467.52g NaCl Lot # 027165
84.99g NaNO₃ Lot # 020809
+ DI Water to 2000 mL

pH start: 8.068 Fisher Accumet 950 meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 7.558 pH probe # 13-620-296 SN# 2291257 P6

Potentiostat: EG & G Model #273A SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 60°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

E_{corr} = -0.2219 V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{pt} = -0.0016

Solution Deaerated with 99.999% N₂

Specimen Examination: No sign of crevice corrosion. 1/4 feet of crevice washer. Mild surface stain.

* Note: Specimen Repolished for Further Testing

Data: C22R141

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

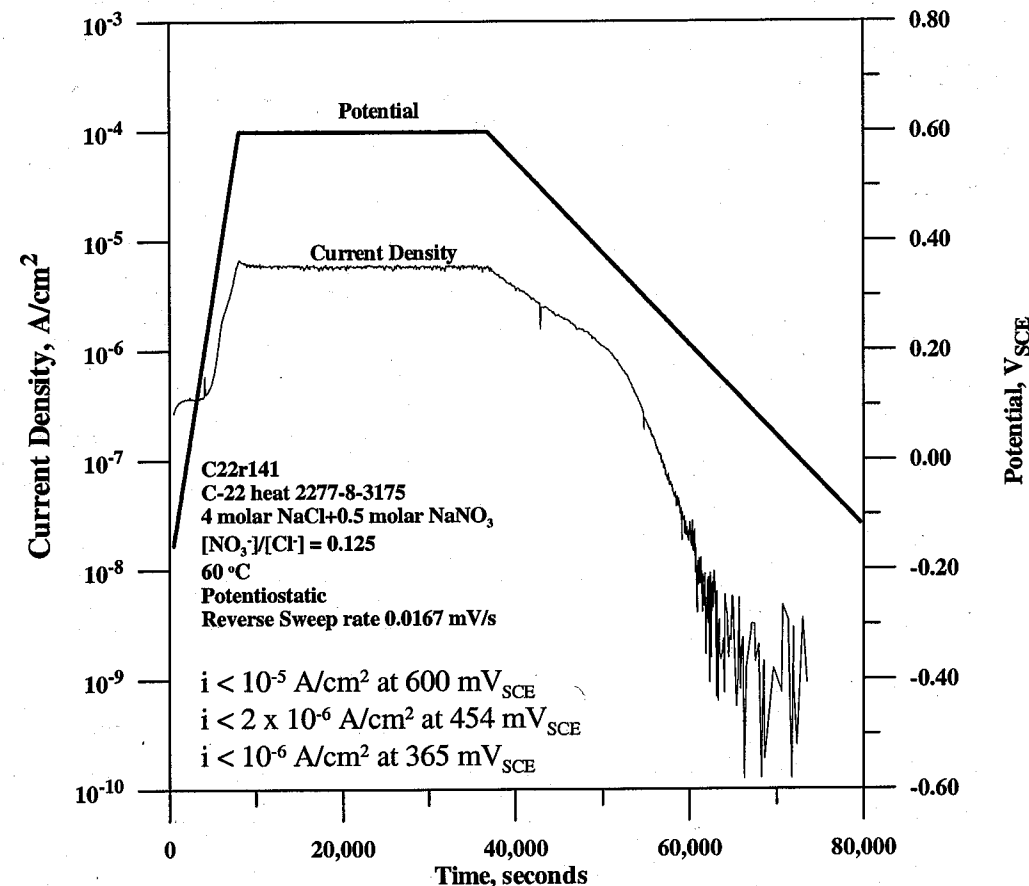
Date _____

Recorded by _____

7/2/03

Chung-che Wu

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

7/8/03

Chung-che Wu

From Page No. _____

OCP v.s. Temp. of C-22 Alloy.

Objective: To understand the variations of open circuit potential ^{a function} as of temperature.

Specimen: Alloy C-22 Cylindrical 2271-8-3175 polished to a 600 gkt finish.

Start wt.: 12.66674g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03

End wt.: 12.66571g

Solution: 0.028M Cl⁻ + 1.4mM HCO₃⁻ + 0.208mM SO₄²⁻ + 0.162mM NO₃⁻
+ 0.105mM F⁻ + DI water to 2000 mL

3.398g NaCl Lot # 027168

0.250g NaHCO₃ Lot # 025478

40 mL SO₄²⁻

20 mL NO₃⁻

Stack Solutions

4 mL F⁻

pH Start: 8.159 Fisher Accumet 950 meter SN# 3340 Cal 8/7/02 Due 8/7/03

pH end: 9.305 pH Probe # 13-620-296 SN# 2291257 P6

Potentiostat: EG&G Model 263A-2 SN# 66105

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0066126

Temperature: 25~95°C Hg Thermometer SN# H00-387 Cal 6/3/03 Due 12/3/03

E_{corr} = -0.2241V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03

E_{PT} = +0.1545V

Solution Deaerated ^{7/3/03 CW} with 99.999% N₂ Solution Saturated with Air

Specimen Examination: No crevice corrosion. No surface stain.

Data: ^{7/3/03 CW} C22RT

To Page No. _____

Witnessed & Understood by me, _____

Date _____

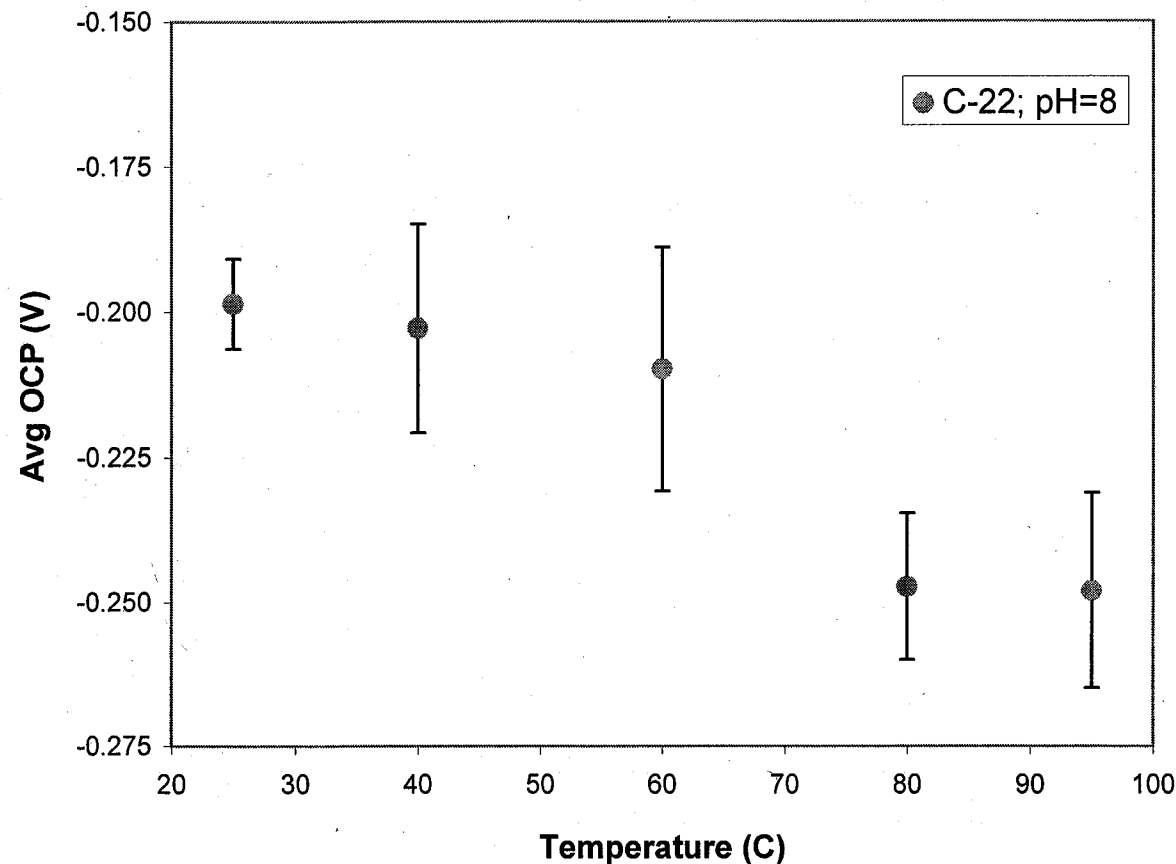
Invented by _____

Date 7/3/03

Recorded by _____

Chung-the Wu

From Page No. _____



C22OCT1

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date 8/26/03

Recorded by _____

Chung-the Wu

From Page No. _____

Repassivation Potential of Alloy C-22

Objective : Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 polished to a 600 grit finish with 2 PTFE crevice washers attached at 50 In-Oz using Proto # 6104 SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 39.82062g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 39.82054g

Solution: 4M NaCl + 0.20M NaNO₃ + DI water to 2000 mL
467.55g NaCl Lot# 027168
34.003g NaNO₃ Lot# 020809

pH start: 7.048 Fisher Accumet 950 meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH end: 7.952 pH Probe #13-620-296 SN# 2291257 P6

Potentiostat: EG & G Model #273 SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 60°C Hg Thermometer SN# A2000-123 Cal 3/27/03 Due 9/27/03

E_{corr} = -0.351 V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = -0.008 V

Solution Deaerated with 99.999% N₂

Specimen Examination: No sign of crevice corrosion. 1/4 feet of crevice washer. Mild surface stain.

* Note: Specimen Repolished for further testing.

Data: C22R142

To Page No. _____

Witnessed & Understood by me, _____

Date _____

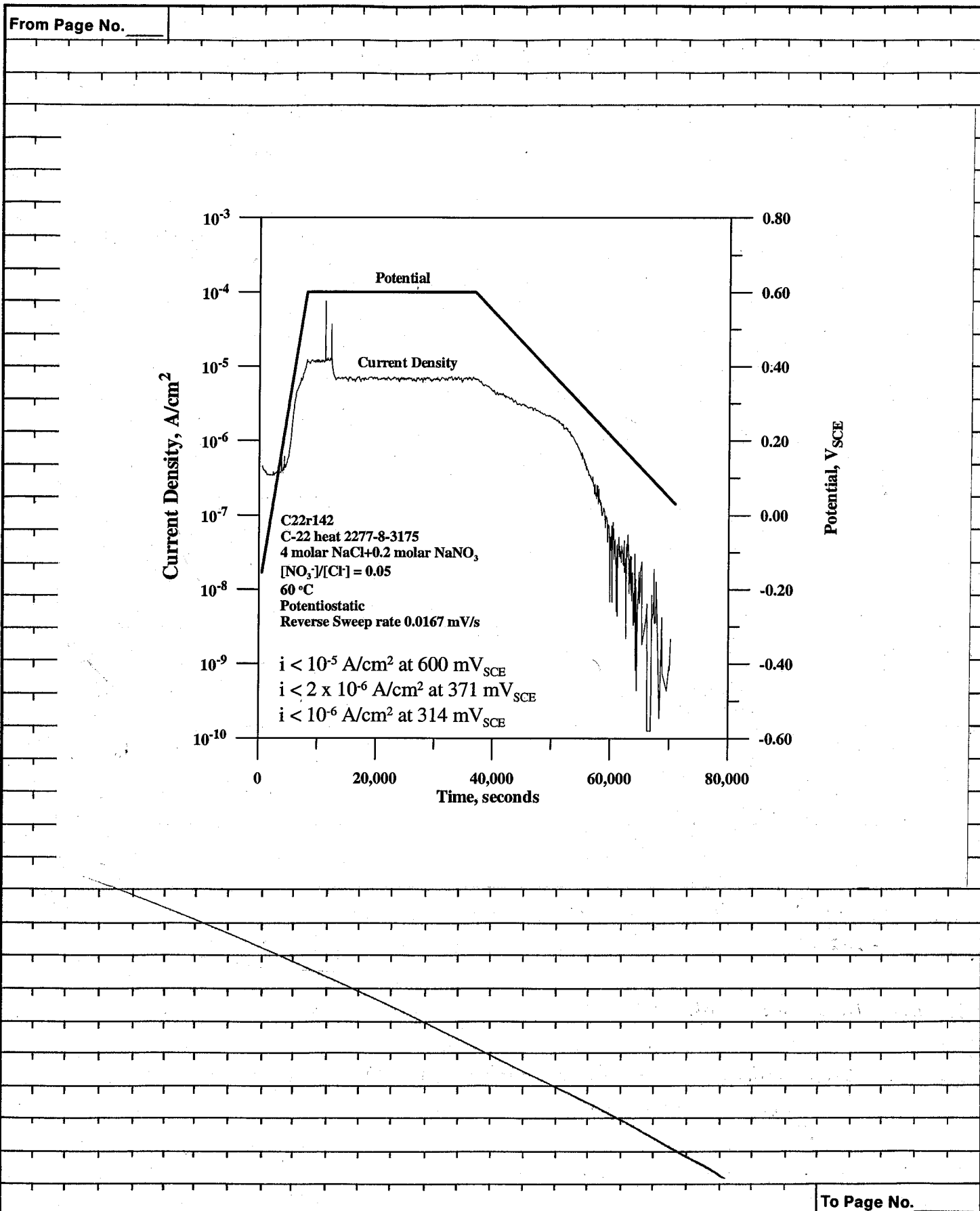
Invented by _____

Date _____

Recorded by _____

7/3/03

Chung Che Wu



To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

7/8/03

Chung Che Wu

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 polished to a 600 grit finish with 2
PTFE crevice washers attached at 50 In-Oz using proto # 6104
SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 39.83002 g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03

End wt.: 39.82871 g

0.10M ~~NaNO₃~~ 9/2/04

Solution: 4M NaCl + ~~0.10M~~ NaNO₃ + DI water to 2000 mL
467.57 g NaCl Lot # 027168
17.004 g NaNO₃ Lot # 020809

Start pH: 8.087 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03

End pH: 7.823 pH Probe # 13-620-296 SN# 2291257 P6

Potentiostat: EG & G Model #273A SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 60°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

E_{corr} = -0.336 V Keithley 614 SN# 469374 Cal 10/28/02 Due 10/28/03E_{PT} = -0.023 VSolution Deaerated with 99.999% N₂

Specimen Examination: No sign of crevice corrosion. 1/4 feet of crevice
washer. Mild surface stain.

*Note: Specimen Repolished for further testing

Data: C22R143

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

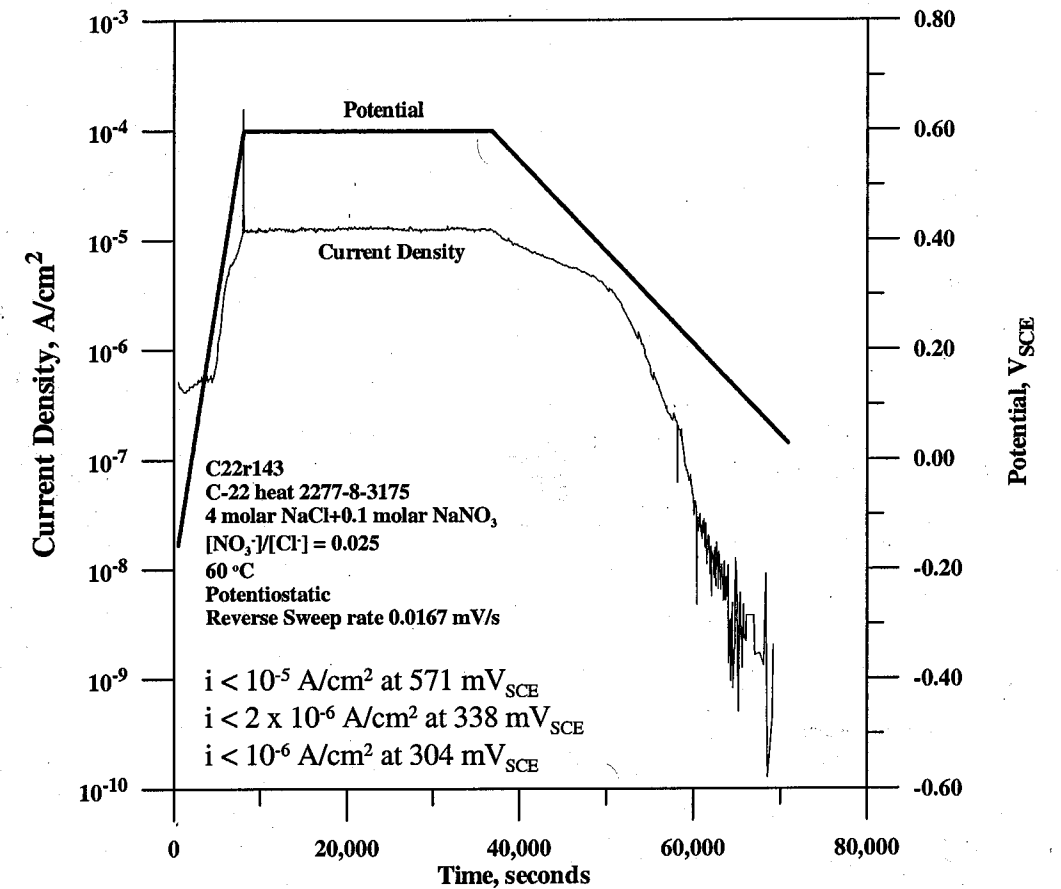
Recorded by _____

7/3/03

Chung-che Wu

TITLE _____

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

7/8/03

Chung-che Wu

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same as page # 2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 Grit Finish
with 2 PTFE Crevice Washers attached at 50 in-OZ using
Proto # 6104 SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 39.92570 g Sartorius Genius SN# 12809099 Cal 5/15/03
End wt.: 39.92321 g Due 11/15/03

Solution: 4M NaCl + 1.0M NaNO₃
359.09 g NaCl Lot# 027168 } total = 467.54 g NaCl
108.45 g NaCl Lot# 030198
169.99 g NaNO₃ Lot# 020809
+ DI water to 2000 mL

7/7/03 CW
pH start: ~~7.72~~ 7.987 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH end: 7.251 pH Probe # 13-620-296 SN# 2291257P6

Potentiostat: EG & G Model # 273 SN# 10120

Counter Electrode: PT flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 95°C Hg Thermometer SN# A2000-123 Cal 3/29/03 Due 9/29/03

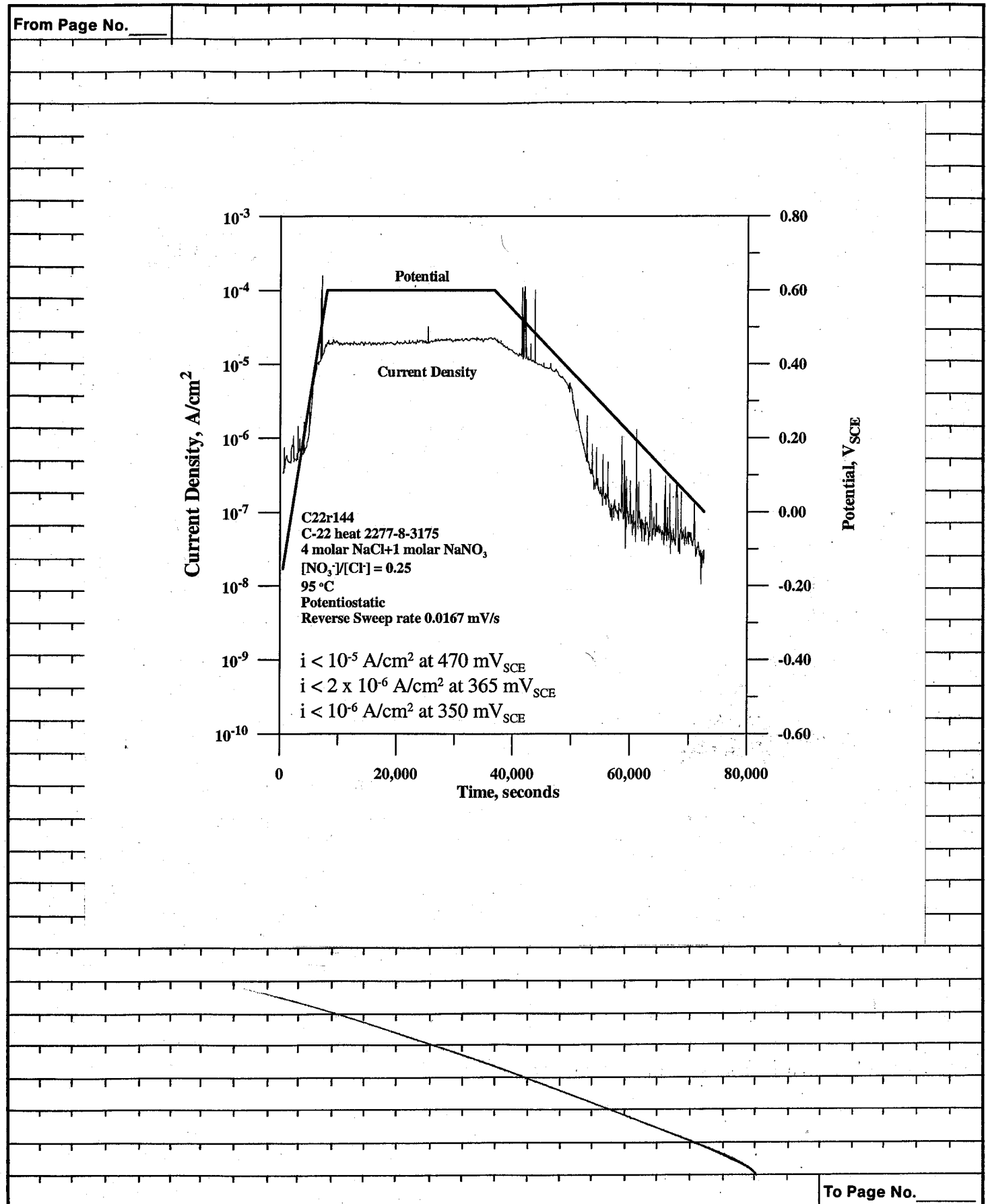
E_{corr} = -0.2565 V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = -0.0233 V

Solution Deaerated with 99.999 % N₂

Specimen Examination: Crevice corrosion (C) observed. 1/24 feet of Crevice Washer.
Mild surface staining. Microscopic Examination.

Data: C22R144

Witnessed & Understood by me,	Date	Invented by	Date	
		Recorded by <i>Ching-che Wu</i>	7/7/03	



Witnessed & Understood by me,	Date	Invented by	Date	
		Recorded by <i>Ching-che Wu</i>	7/8/03	

From Page No. _____

Repassivation Potential of C-22 Alloy

Objective: Same as page #2

Specimen: C-22 Alloy 2277-8-3175 Polished to a 600 Grit finish with 2 PTFE Crevice Washers attached at 50 in-oz using Proto #6104 SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.11765g Satorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.11388g

Solution: 4 M NaCl + 0.5 M NaNO₃ + DI water to 2000 mL
467.52 g of NaCl Lot# 030198
84.99 g of NaNO₃ Lot# 020809

Start pH: 7.954 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
End pH: 7.436 pH Probe # 13-620-296 SN# 2291257 P6

Potentiostat: EG & G Model # 273A SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 95°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

$E_{corr} = -0.4035 V$ Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
 $E_{PT} = -0.3345 V$

Solution Deaerated with 99.999% N₂

Specimen Examination: No sign of Crevice Corrosion. 1/4 feet of crevice washer. Mild Surface Stain.

Data: C22R145 To Page No. _____

Witnessed & Understood by me,

Date

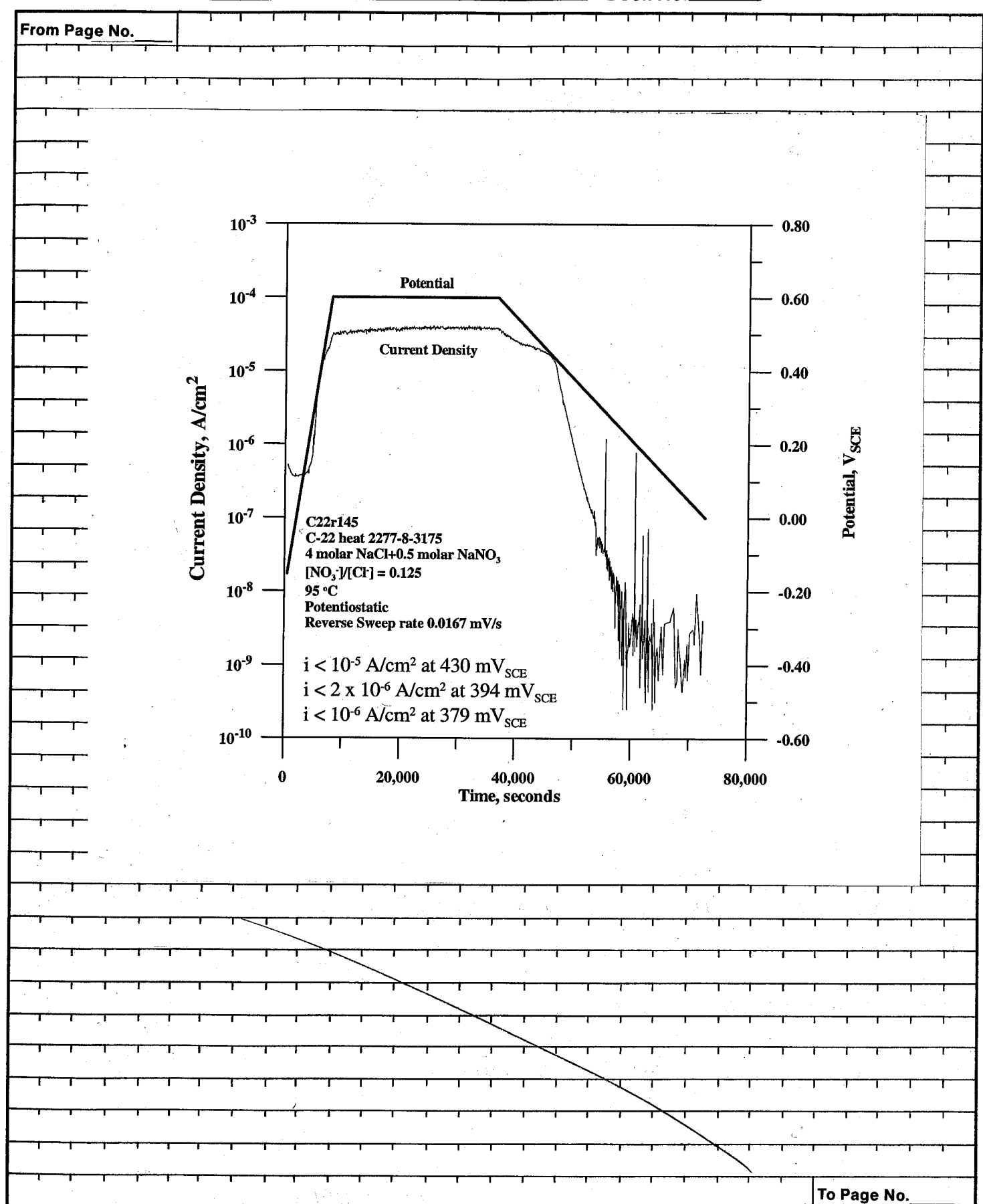
Invented by

Date

Recorded by

Chung-che Wu

7/7/03



Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

Chung-che Wu

7/8/03

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 Grit finish with 2 PTFE Crevice Washers attached at 50 in-oz using Proto # 6104
SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.13662 g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.15313 g

Solution: 4M NaCl + 0.20M NaNO₃ + DI water to 2000 mL
467.52g NaCl Lot# 030198
34.04g NaNO₃ Lot# 020809

pH Start: 8.197 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03
pH end: 7.511 pH Probe #13-620-296 SN#2291257 P6

Potentiostat: EG & G Model #273 SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 95°C Hg Thermometer SN# A2000-123 Cal 3/27/03 Due 9/27/03

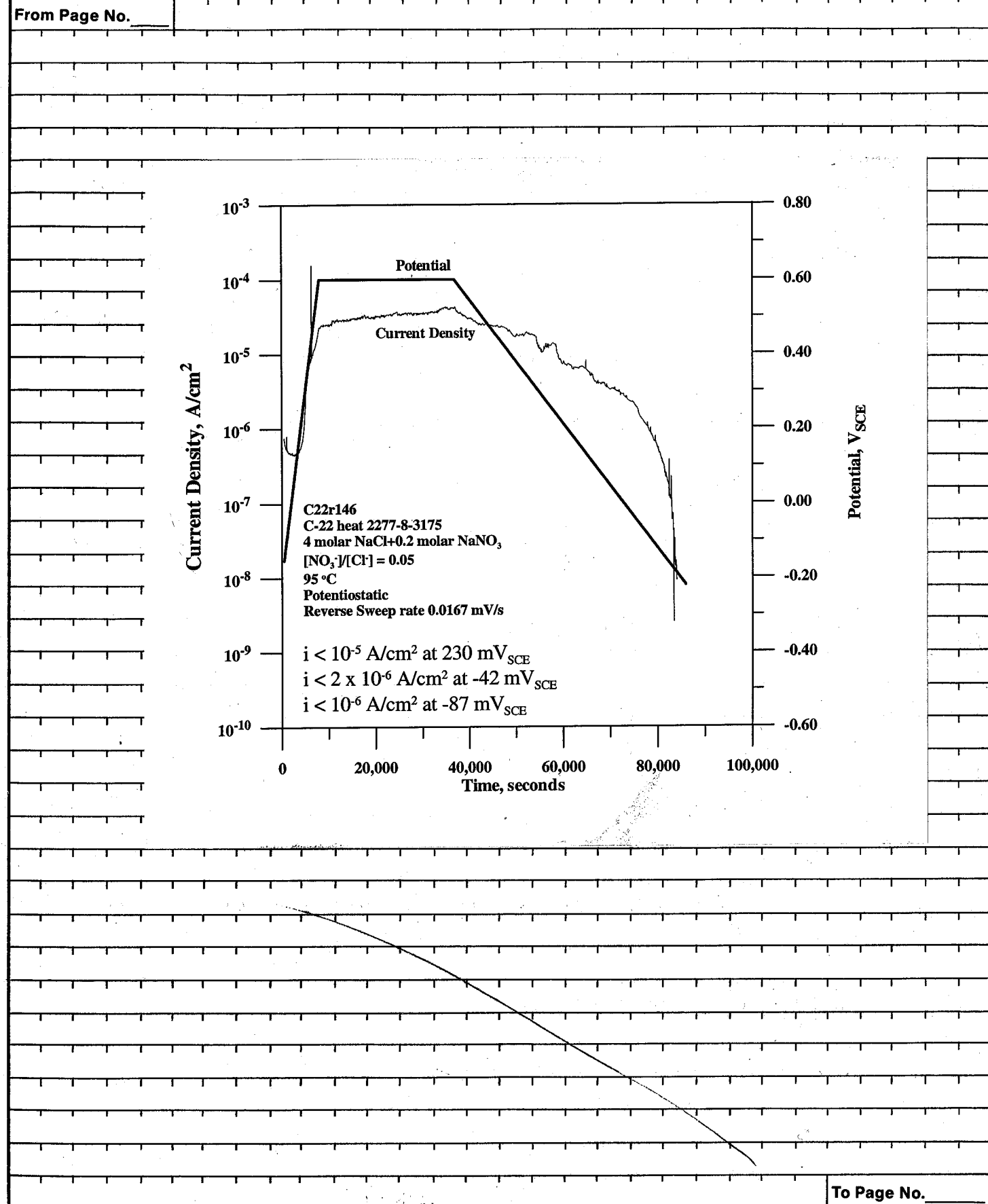
E_{corr} = -0.493V Keithley 614 SN# 461374 Cal 10/28/02 Due 10/28/03
E_{PT} = -0.037V

Solution deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion observed. 3/4 feet of crevice washer.
Heavy Surface Stain.

Data: C22R146 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Ching Che Wu</i>	7/8/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Ching Che Wu</i>	7/17/03

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Repassivation Potential of Alloy C-22

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 Grit finish with 2 PTFE crevice washers attached at 50 in-OZ using Proto # 6104 SN# 139072
Cal 3/6/03 Due 9/6/03

Start Wt.: 40.17119g Satorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End Wt.: 40.13149g

Solution: 4M NaCl + 0.10M NaNO₃ + DI Water to 2000 mL
467.53g NaCl Lot # 030198
17.00g NaNO₃ Lot # 020809

Start pH: 8.336 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
End pH: 7.493 pH Probe # 13-620-296 SN# 2291257P6

Potentiostat: EG & G Model # 273A SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 95°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

$E_{corr} = -0.404V$ Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
 $E_{PT} = -0.313V$

Solution deaerated with 99.999% N₂

Specimen Examination: Crevice corrosion observed. 1/4 feet of crevice washer.
Heavy surface stain.

Data: C22R147

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

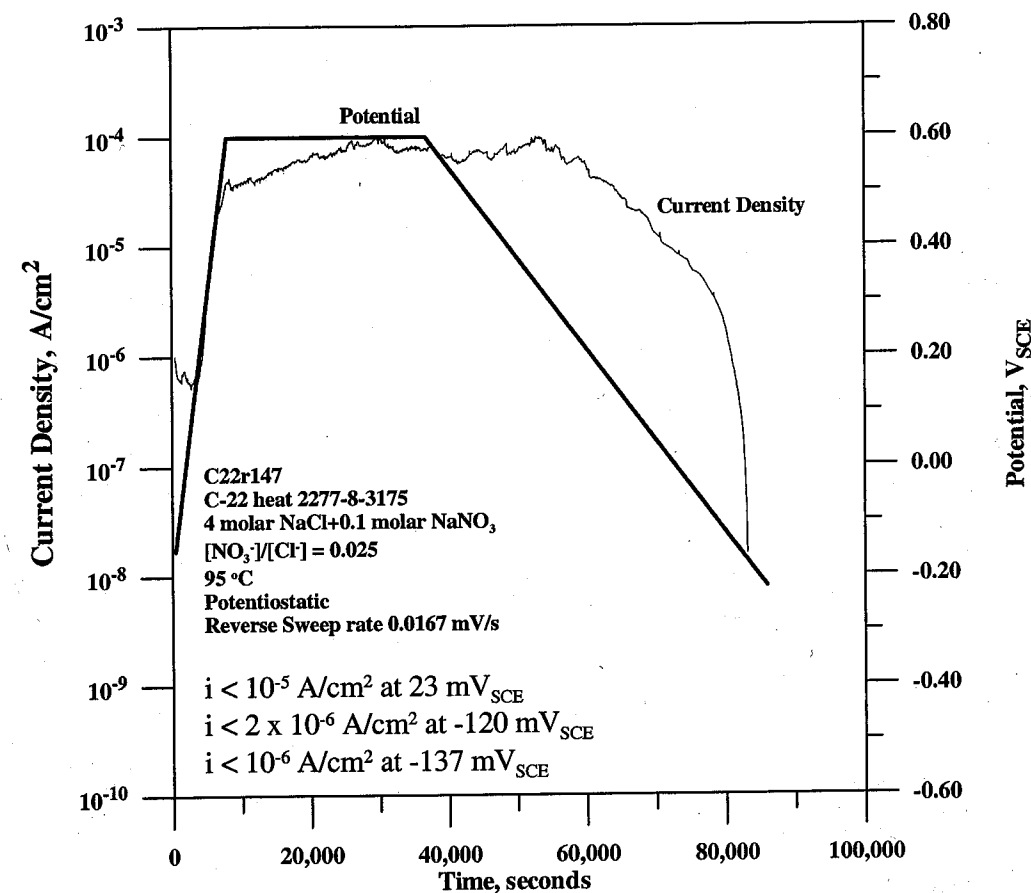
Date _____

Recorded by _____

Chung-Lee Wu

7/8/03

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

Chung-Lee Wu

7/17/03

From Page No. _____

Repassivation Potential of C-22 Alloy

Objective: Same as pg. 2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 Grit finish with 2 PTFE crevice washers attached at 50 in-oz using Proto # 6104 SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.20461 g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.20391 g

Solution: 4M NaCl + 0.05M NaNO₃ + DI water to 2000 mL
467.55 g NaCl Lot# 030198
8.502 g NaNO₃ Lot# 020809

pH Start: 8.213 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 7.754 pH Probe # 13-620-296 SN# 2291257 P6

Potentiostat: EG & G Model # 273 SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 60°C Hg Thermometer SN# 2000-123 Cal 3/27/03 Due 9/27/03

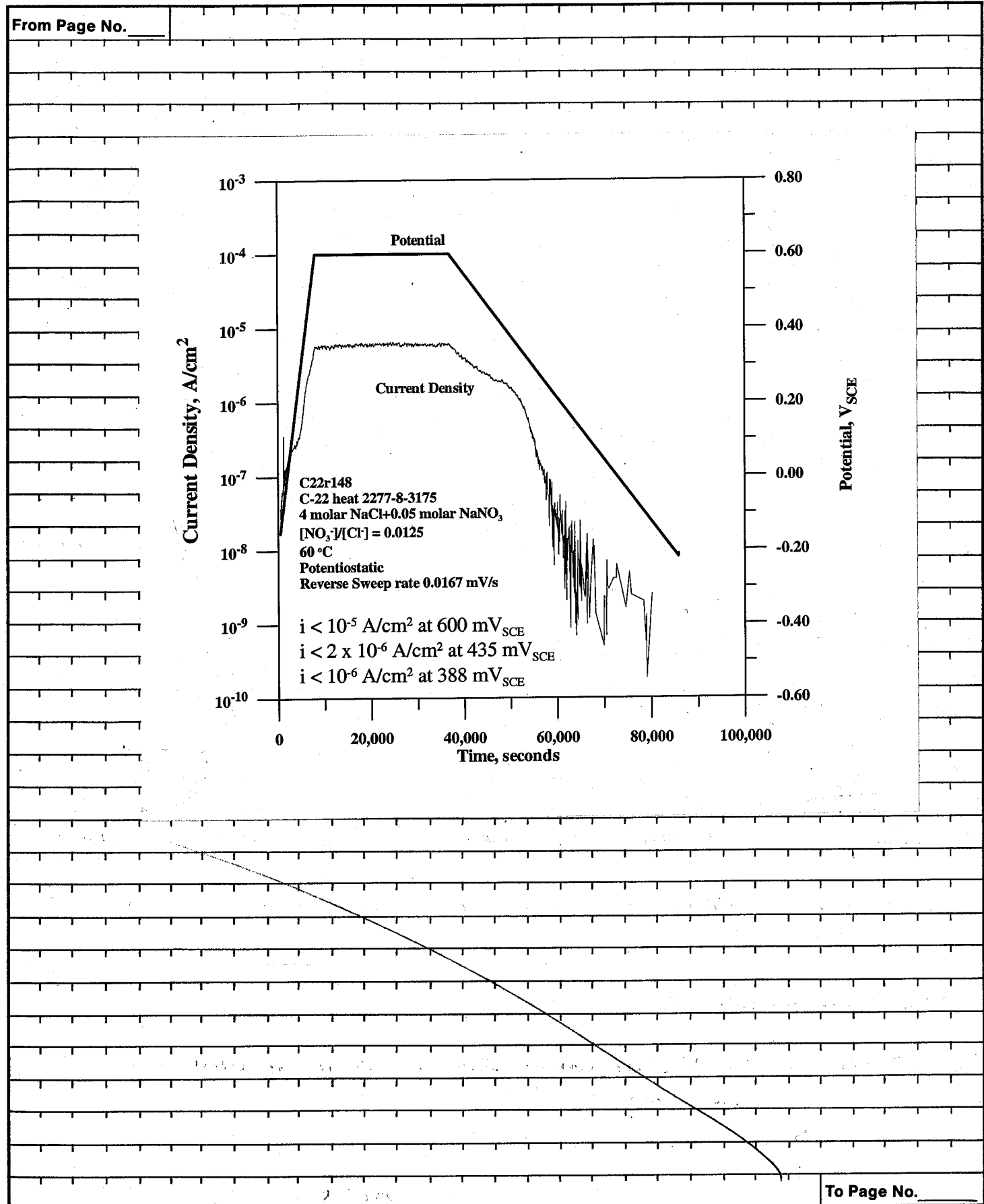
E_{corr} = -0.347V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.028V

Solution Deaerated with 99.999 % N₂

Specimen Examination: Crevice corrosion observed, 3/4 crevice washer feet.
Mild surface stain.

Data: C22R148 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	7/9/03
		Chung-De Wu	



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	7/17/03
		Chung-De Wu	

From Page No. _____

Repassivation Potential of C-22 Alloy

Objective: Same as pg. # 2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 Grit Finish with 2
PTFE Crevice washers attached at 50 in-oz using Proto # 6104
SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.08959 g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.08852 g

Solution: 4M NaCl + 0.01M NaNO₃ + DI water to 2000 mL
467.54 g NaCl Lot # 030198
1.703 g NaNO₃ Lot # 020809

pH Start: 8.119 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 7.647 pH Probe # 13-620-296 SN# 2291257P 6

Potentiostat: EG & G Model # 273A SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 60°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

$E_{corr} = -0.316V$ Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
 $E_{PT} = -0.138V$

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice corrosion observed. 7/24 feet of crevice washer.
Mild surface stain.

Data: C22R149

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

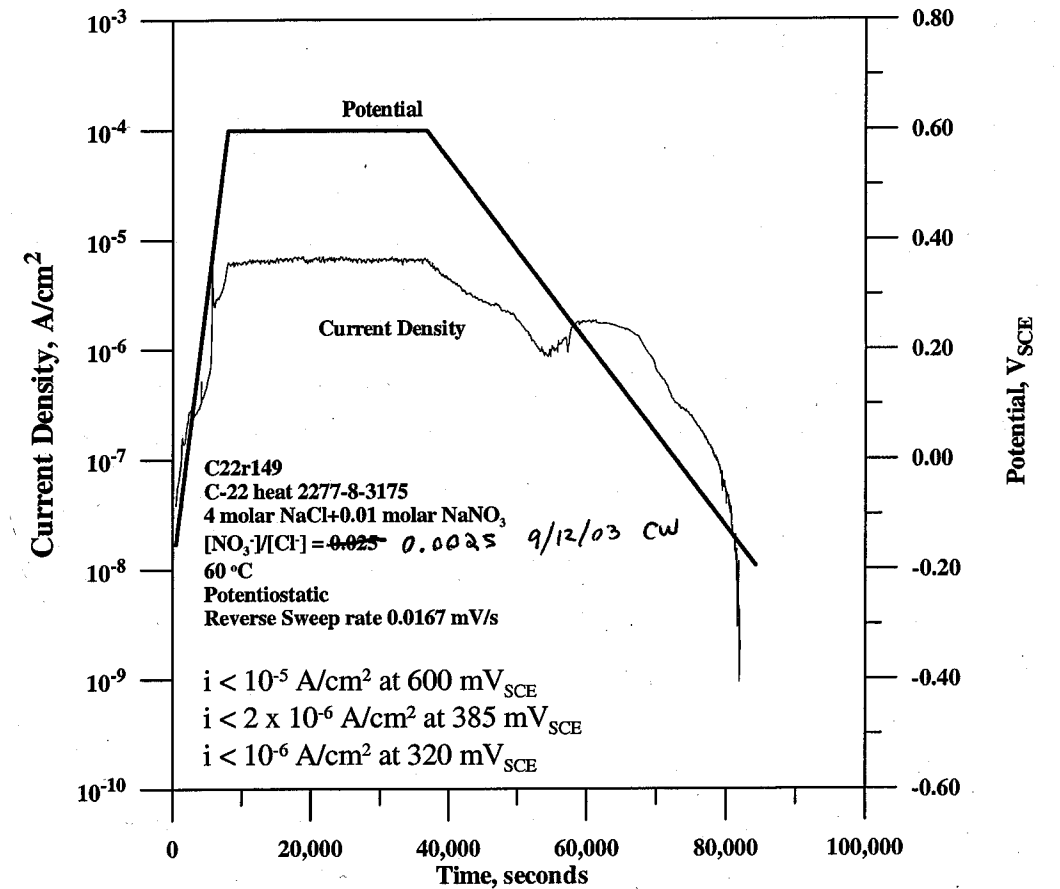
Recorded by _____

7/9/03

Chung Che Wu

TITLE _____

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

7/17/03

Chung Che Wu

From Page No. _____

Repassivation ^{9/10/03 CW} ~~Poten~~ Potential of C-22 Alloy

Objective: Same as pg. 2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2 PTFE attached at 50 in-oz using Proto # 6104 SN# 139072 crevice washers Cal 3/6/03 Due 9/6/03

Start wt.: 40.09443g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.09128g

Solution: 4M NaCl + 0.4M NaNO₃ + DI Water to 2000 mL
467.56g NaCl Lot# 030198
68.05g NaNO₃ Lot# 020809

pH Start: 8.00 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 7.468 PH Probe # 13-620-296 SN# 2291257P6

Potentiostat: EG & G Model # 273 SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 95°C Hg Thermometer SN# 2000-123 Cal 3/27/03 Due 9/27/03

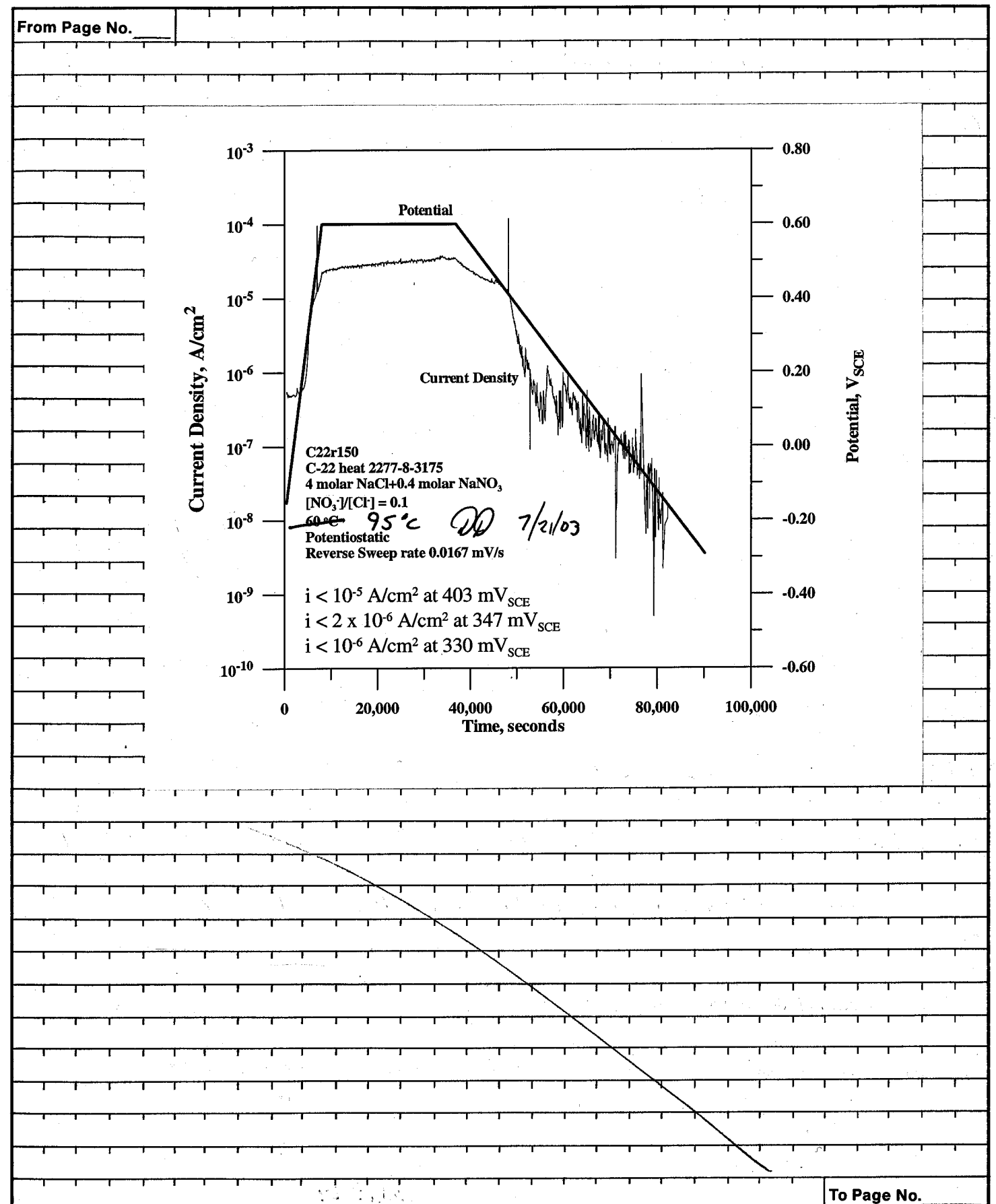
E_{corr} = -0.340V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = -0.096V

Solution Deaerated with 99.999% N₂

Specimen Examination: No crevice corrosion. 1/4 inch crevice washer.
Mild surface stain.

Data: C22R150

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	9/11/03
		Chung Che Wu	



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	9/17/03
		Chung Che Wu	

From Page No. _____

Repassivation Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2 PTFE
Crevice washers attached at 50 in-oz using Proto #6104 SN#139072
Cal 3/6/03 Due 9/6/03

Start wt.: 39.76817g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: 39.76486g

Solution: 4M NaCl + 0.3M NaNO₃ + DI water to 2000 mL
467.53g NaCl Lot #030198
51.03g NaNO₃ Lot #020809

pH start: 7.875 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03
pH End: 7.377 pH Probe #13-620-296 SN#2291257P6

Potentiostat: EG & G Model #273A SN#10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN#0249092

Temperature: 95°C Hg Thermometer SN#C98-106 Cal 5/1/03 Due 5/1/04

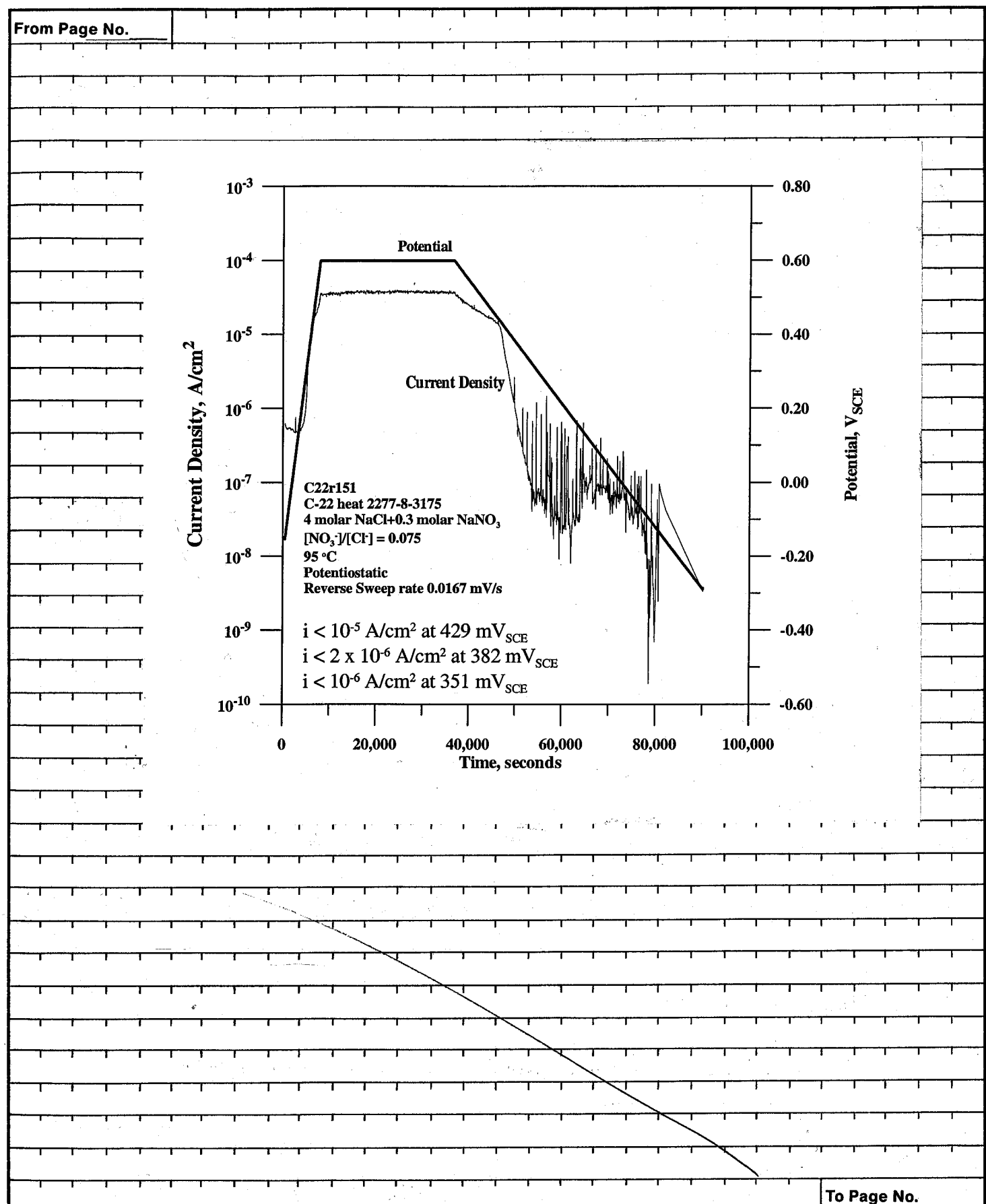
E_{corr} = -0.391V Keithley 614 SN#467374 Cal 10/28/02 Due 10/28/03
E_{PT} = -0.379V

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice corrosion observed. 1/24 feet crevice washer.
Mild surface stain.

Data: C22R151 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung Che Wan</i>	7/11/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung Che Wan</i>	7/17/03

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Repassivation Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2 PTFE crevice washers attached at 50 in-oz using Proto # 6104 SN# 139072
Cal 3/6/03 Due 9/6/03

Start wt.: 40.49744 g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 49.46769 g

Solution: 4M NaCl + 0.8M Na₂SO₄ + DI water to 2000 mL
469.55g NaCl Lot# 030198
227.28g Na₂SO₄ Lot# 025157

pH Start: 8.631 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 7.568 pH Probe # 13-620-296 SN# 2291257P6

Potentiostat: EG & G Model # 273 SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 95°C Hg Thermometer SN# 2000-123 Cal 3/27/03 Due 9/27/03

E_{corr} = -0.200V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.057V

Solution Deaerated with 99.999% N₂

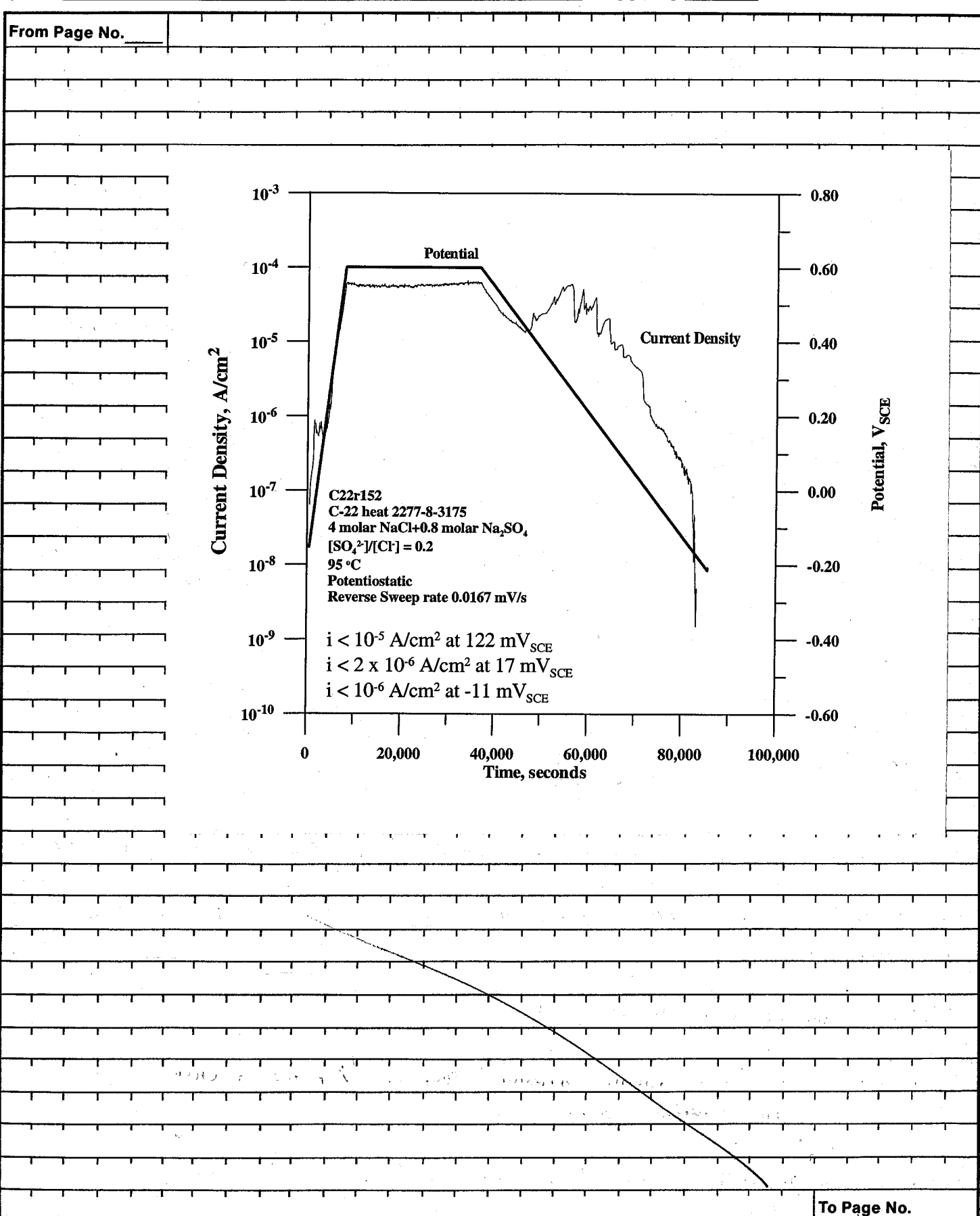
Specimen Examination: Crevice corrosion observed. 1/24 feet of crevice washer.
Heavy surface staining.

Note: Small amount of precipitates detected @ Temp. 92°C.
A layer of crystallized precipitate formed at the bottom of test cell.

Witnessed & Understood by me, _____ Date _____
Invented by _____ Date 7/14/03
Recorded by *Ching Che Wu*

Data: C22R152

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Witnessed & Understood by me, _____ Date _____
Invented by _____ Date 7/17/03
Recorded by *Ching Che Wu*

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Repassivation Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2 PTFE crevice washers attached at 50 in-03 using Proto # 6104 SN# 139072
Cal 3/6/03 Due 9/6/03

Start wt.: 39.76469g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 39.72492g

Solution: 4M NaCl + 0.6M Na₂SO₄ + DI water to 2000 mL
467.54g NaCl Lot # 030198
170.46g Na₂SO₄ Lot # 025157

pH Start: 8.602 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 7.330 pH Probe #13-620-296 SN# 2291257 P 6

Potentiostat: EG&G Model # 273A SN# 10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 95°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

E_{corr} = -0.293V Keithley 614 SN# 467374 Due 10/28/03 Cal 10/28/02
E_{PT} = -0.038V

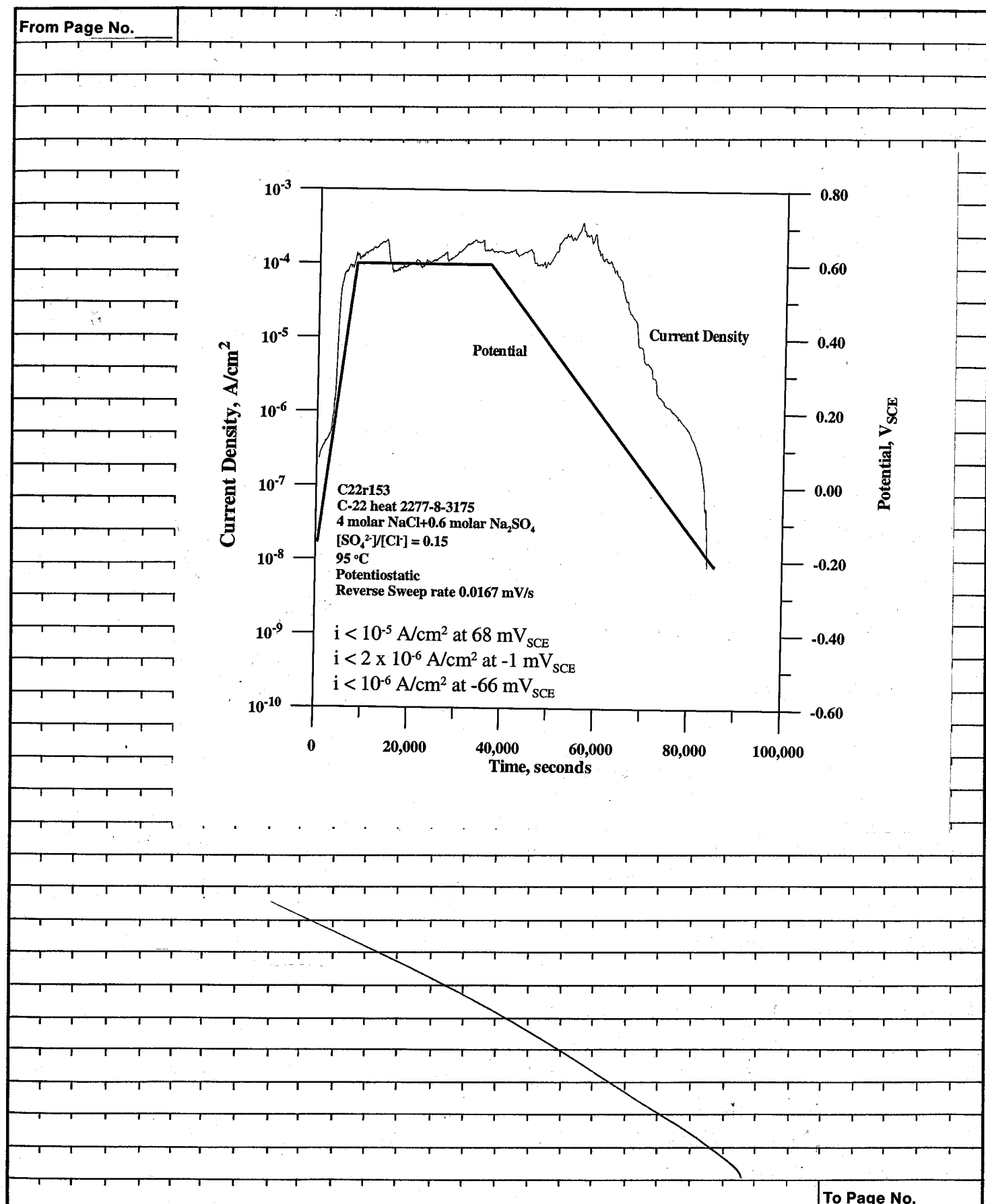
Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice corrosion observed. 1/4 feet of crevice washer.
Heavy surface staining.

Note: Greenish precipitate formed. No layer of crystallized precipitate formation at the bottom of test cell.

Data: C22R153

Witnessed & Understood by me,	Date	Invented by	Date	
		Recorded by <i>Chung-Lee Wu</i>	7/14/03	



Witnessed & Understood by me,	Date	Invented by	Date	
		Recorded by <i>Chung-Lee Wu</i>	7/17/03	

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OCP Versus Temperature of C-22 Alloy

Objective: To understand the variations of open-circuit potential as function of temperature.

Specimens: 3 Alloy C-22 Cylinders 2297-8-3175 polished to a 600 grit finish.

Specimen #1: 9/14/04 11/15/03
Start wt.: 12.46400g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: ~~12.26914g~~ ^{7/23/03} ~~12.46580g~~ 12.46580g 9/21/04

Specimen #2:
Start wt.: 12.41762g
End wt.: 12.43646g

Specimen #3:
Start wt.: 12.26593g
End wt.: 12.26914g

Solution: 0.028M Cl^- + 1.4mM HCO_3^- + 0.208mM SO_4^{2-} + 0.162mM NO_3^- + 0.105mM F^-
+ DI water to 2000 mL

3.282g NaCl Lot# 029168
0.253g $NaHCO_3$ Lot# 025478
40 mL SO_4^{2-}
20 mL NO_3^-
4 mL F^- } Stock Solutions

pH Start: 8.278 Fisher Accumet 950 Meter SN#3340 Cal 8/9/02 Due 8/7/03
pH End: 9.779 pH Probe #13-620-296 SN#2291257P6

Counter Electrode: Pt Flag

Reference: Fisher Accumet #13-620-52 SN#8205244

Temperature: from 95°C to 25°C Hg Thermometer SN#115749 Cal 1/13/03 Due 1/14/04
* Thermometer replaced with SN#C96-852 Cal 6/3/03 Due 12/3/03

$E_{corr}(\#1) = -0.064V$ Keithley 614 SN#467374 Cal 10/28/02 Due 10/28/03
 $E_{PT} = +0.139V$

$E_{corr}(\#2) = -0.247V$, $E_{corr}(\#3) = -0.269V$

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Recorded by *Chung Che Wu*

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Solution saturated with Air.

Specimens Examination: No corrosion observed. No surface staining for all specimens.

Note: E_{corr} and E_{PT} measured with Keithley 614 agree with values measured by data acquisition system.

Note: Specimens repolished for further testing.

Temperature (C)	Specimen 1-PH=8 (V)	Specimen 2-PH=8 (V)	Specimen 3-PH=8 (V)
25	0.02	0.04	0.08
40	0.00	0.02	0.06
60	-0.03	-0.04	-0.05
80	-0.05	-0.11	-0.11
95	-0.08	-0.20	-0.20

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Witnessed & Understood by me, _____ Date _____
Invented by _____ Date 7/24/03
Recorded by *Chung Che Wu*

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OCP Versus Temperature of C-22 Alloy

Objective: To understand the variations of open-circuit potential as a function of temperature.

Specimens: 3 Alloy C-22 Cylinders 2277-8-3175 Polished to a 600 Grit finish.

Specimen # 4
Start wt.: 12.75482g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: 12.75498g

Specimen # 5
Start wt.: 12.78176g
End wt.: 12.78193g

Specimen # 6
Start wt.: 12.76456g
End wt.: 12.76480g

Solution: 0.028M Cl⁻ + 1.18 mM CO₃²⁻ + 0.208 mM SO₄²⁻ + 0.162mM NO₃⁻
+ 0.105mM F⁻ + DI water to 2000 ml

3.289g NaCl Lot # 027168
0.251g Na₂CO₃ Lot # 028087
40 ml SO₄²⁻
20 ml NO₃⁻ } Stock Solutions
4 ml F⁻

pH Start: 10.319 ~~Fisher Accumet #13-620-52 SN# 00042119~~ 7/15/03 CW
Fisher Accumet 950 Meter SN# 3840 Cal 8/7/02 Due 8/7/03
pH End: 9.913 pH probe #13-620-296 SN# 2291257P6

Counter Electrode: Pt Flag

Reference: Fisher Accumet # 13-620-52 SN# 00042119

Temperature: From 95°C to 25°C Hg Thermometer SN# H98-170 Cal 4/29/03 Due 4/29/04

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E_{corr} (#4) = -0.382V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.127V
E_{corr} (#5) = -0.321V , E_{corr} (#6) = -0.354V
Solution Saturated with Air

Specimen Examination: All specimens display no sign of corrosion. No surface staining.

Note: E_{corr} and E_{PT} measured with Keithley 614 agree with values measured by data acquisition system.

Temperature (C)	Specimen 4 (V)	Specimen 5 (V)	Specimen 6 (V)
25	0.02	0.01	0.03
40	0.04	-0.02	-0.01
60	-0.04	-0.12	-0.16
80	-0.11	-0.26	-0.27
95	-0.34	-0.35	-0.33

Note: Specimens repolished for further testing.

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Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung-Che Wu</i>	7/24/03

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Repassivation Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2 PTFE crevice washers attached at 50 in-oz using Proto #6104 SN# 139072
Cal 3/6/03 Due 9/6/03

Start wt.: 40.20509g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.20564g

Solution: 8M Mg²⁺ cw Cl⁻ + 2M NO₃⁻ + DI to 2000 mL
1,626.78 g of Mg(Cl₂)₆H₂O Lot # 000036
512.94 g of Mg(NO₃)₂ · 6H₂O Lot # 033942

pH Start: 4.351 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 4.845 pH probe #13-620-296 SN# 2291257P6

Potentiostat: EG & G Model # 273 SN# 10120

Counter Electrode: Pt Flag

Reference Electrode: Fisher 13-620-52 SN# 0251439

Temperature: 110°C Hg Thermometer SN# 2000-123 Cal 3/29/03 Due 9/29/03

E_{corr} = -0.170V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.244V

Solution Deaerated with 99.999% N₂

Specimen Examination: No crevice corrosion. 9/24 feet of corrosion washer.
No surface staining.

Note: Sample repolished for further testing. Data: C22R154

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Witnessed & Understood by me, _____

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Invented by _____

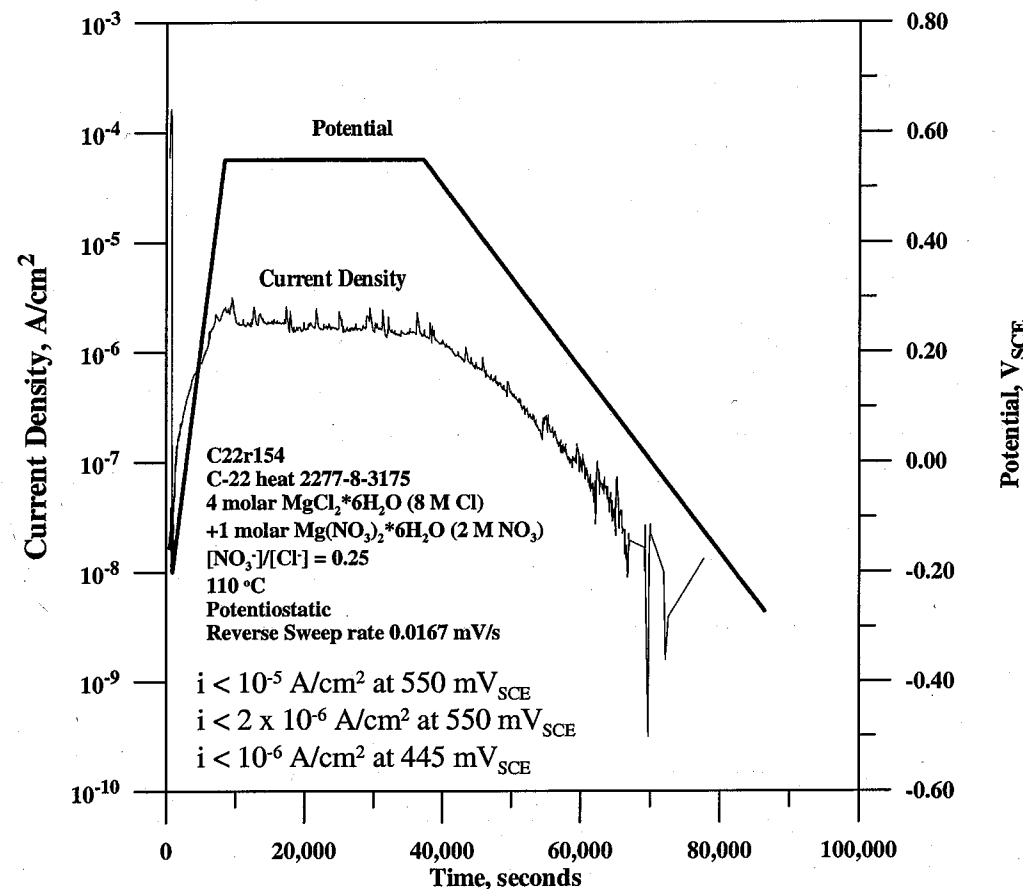
Date _____

Recorded by _____

7/18/03

Chung Che Wu

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Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

7/22/03

Chung Che Wu

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Repassivation Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Blished to a 600 Grit finish with 2 PTFE Crevice washers attached at 50 in-oz using Proto #6104
SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.28740g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.28844g

Solution: 8M Cl⁻ + 1.6M NO₃⁻ + DI to 2000 mL
1626.67g Mg(Cl₂·6H₂O → (1339.25g from Lot #000036)
287.42g from Lot #004768)
410.37g Mg(NO₃)₂·6H₂O Lot# 033942

pH Start: 4.481 Fisher Accumet 950 Meter SN# 3340 Cal 8/4/02 Due 8/7/03
pH End: 4.968 pH probe # 13-620-296 SN# 2291257P6

Potentiostat: EG&G Model # 273A SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 110°C Hg Thermometer SN# C98-106 Cal 5/11/03 Due 5/1/04

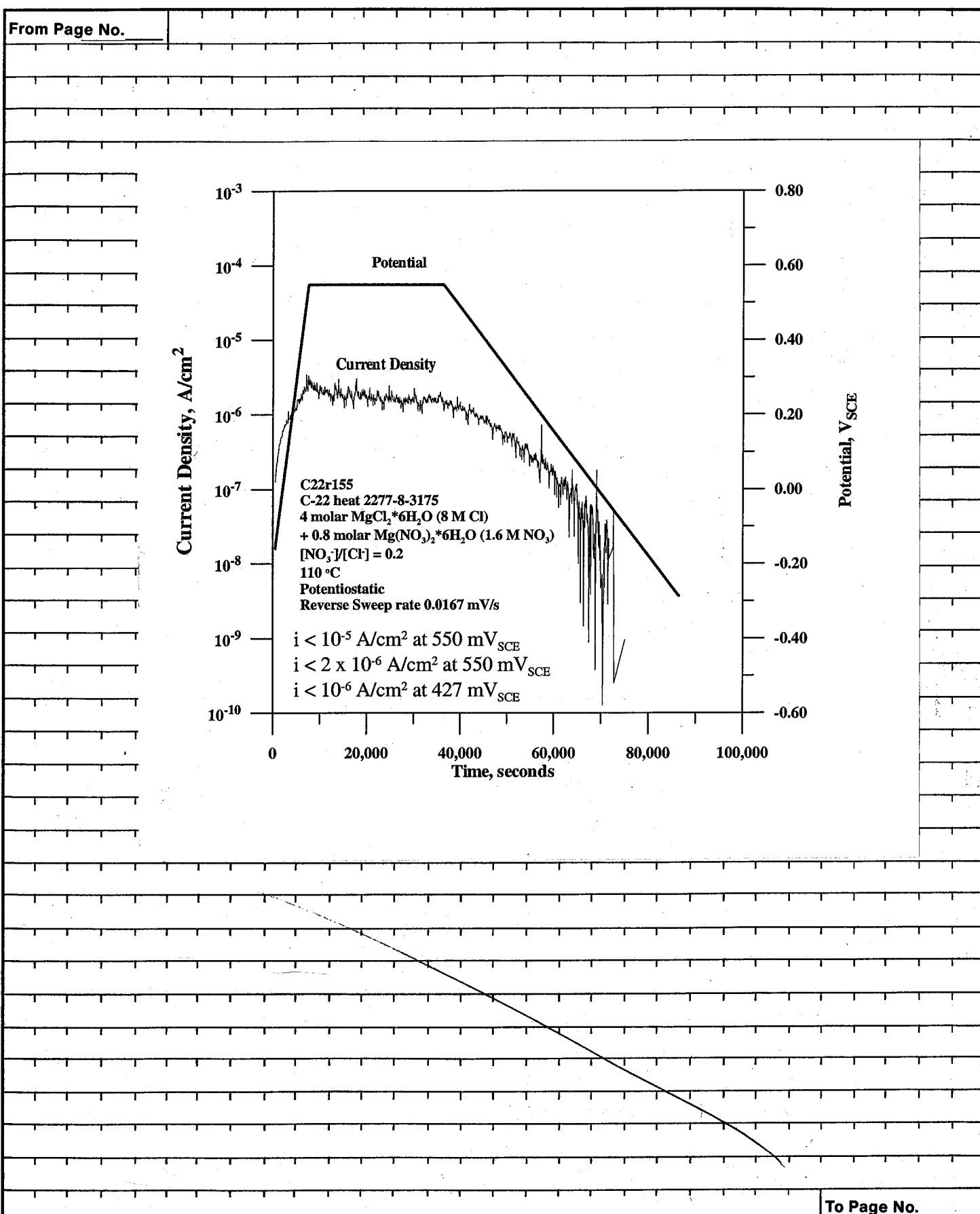
E_{corr} = -0.208V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = -0.098V

Solution Deaerated with 99.999 % N₂

Specimen Examination: No crevice corrosion. 1/24 feet of crevice washer.
No surface staining.

Note: Sample repolished for further testing Data: C22R155 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	9/18/03
		Chung Che Wen	



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	9/22/03
		Chung Che Wen	

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Repassivation Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2
PTFE crevice washers attached at 50 in-oz using Proto # 6104
SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: ~~40.20509 g~~ 40.19595 g Sartorius Genius SN# 12809099
End wt.: 40.19583 g Cal 5/15/03 Due 11/15/03

Solution: 8M of Cl⁻ + 1.2M of NO₃⁻ + DI water to 2000 ml
1626.95 g of Mg(Cl₂)₂·6H₂O Lot # 004768
398.03 g of Mg(NO₃)₂·6H₂O Lot # 033942

pH Start: 4.166 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 4.202 pH Probe # 13-620-296 SN# 2291257P6

Potentiostat: EG & G Model #273 SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 110 °C Hg Thermometer SN# 2000-123 Cal 3/27/03 Due 9/27/03

E_{corr} = -0.128 V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.309 V

Solution Deaerated with 99.999% N₂

Specimen Examination: No sign of crevice corrosion. No surface staining.
1/24 feet of crevice washer.

Note: Sample repolished for further testing.

Data: C22R156

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Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

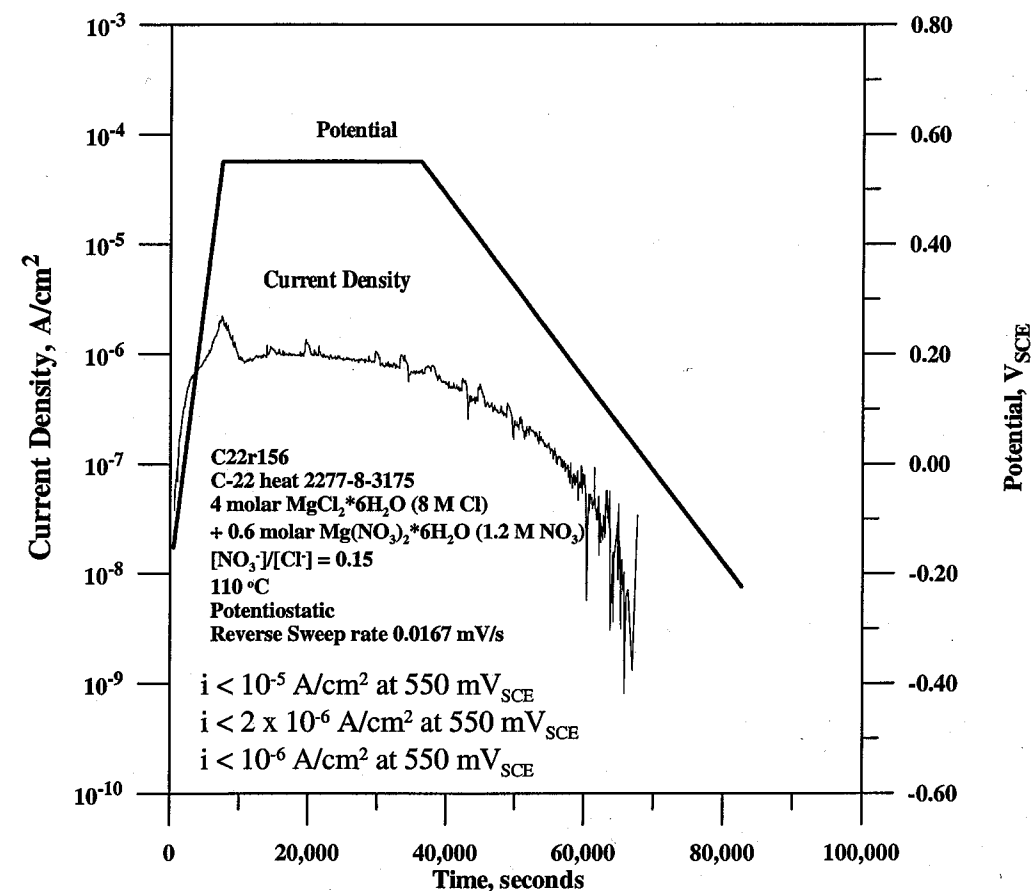
Recorded by _____

7/22/03

Chung-Chu Wu

TITLE _____

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

7/24/03

Chung-Chu Wu

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Repassivation Potential of C-22 Alloy

Objective: See pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 Grit finish with 2 PTFE
Crevice washers attached at 50 in-oz using Proto # 6104 SN#139072
Cal 3/6/03 Due 9/6/03

Start wt.: 39.86845g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: 39.86829g

Solution: 8M of Cl^- + 0.8M of NO_3^- + DI water to 2000mL
1626.56g of $Mg(Cl)_2 \cdot 6H_2O$ Lot# 004768
205.65g of $Mg(NO_3)_2 \cdot 6H_2O$ Lot# 033942

pH Start: 4.710 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03
pH End: 5.062 pH Probe #13-620-296 SN# 2291257 P 6

Potentiostat: EG & G Model #273A SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 110°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

$E_{corr} = -0.193V$ Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
 $E_{PT} = +0.024V$

Solution Deaerated with 99.999 % N_2

Specimen Examination: Crevice corrosion observed. $\frac{7}{24}$ feet of crevice washer.
No surface staining.

Date: C22R157

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Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

Chung Che Wu

7/22/03

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Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

Chung Che Wu

7/24/03

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Repassivation Potential of C-22 Alloy

Objective: Same as pg. 2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2 PTFE crevice washers attached at 50 in-oz using Proto #6104 SN#139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.38017g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.37765g

Solution: 8 M of Cl⁻ + 0.4 M of NO₃⁻ + DI water to 2000 mL
1626.97 g of Mg(Cl₂)₂·6H₂O Lot# 004768
103.01 g of Mg(Cl₂)₂·6H₂O Lot# 033942

pH Start: 5.196 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03
pH End: 5.622 pH Probe #13-620-296 SN#2291257P 6

Potentiostat: EG & G Made #273 SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#0251439

Temperature: 110°C Hg Thermometer SN#2000-123 Cal 3/27/03 Due 9/27/03

E_{corr} = -0.263V Keithley 614 SN#467374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.095V

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice corrosion observed, 3/4 feet of crevice washers. light surface staining.

Data: C22R158

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

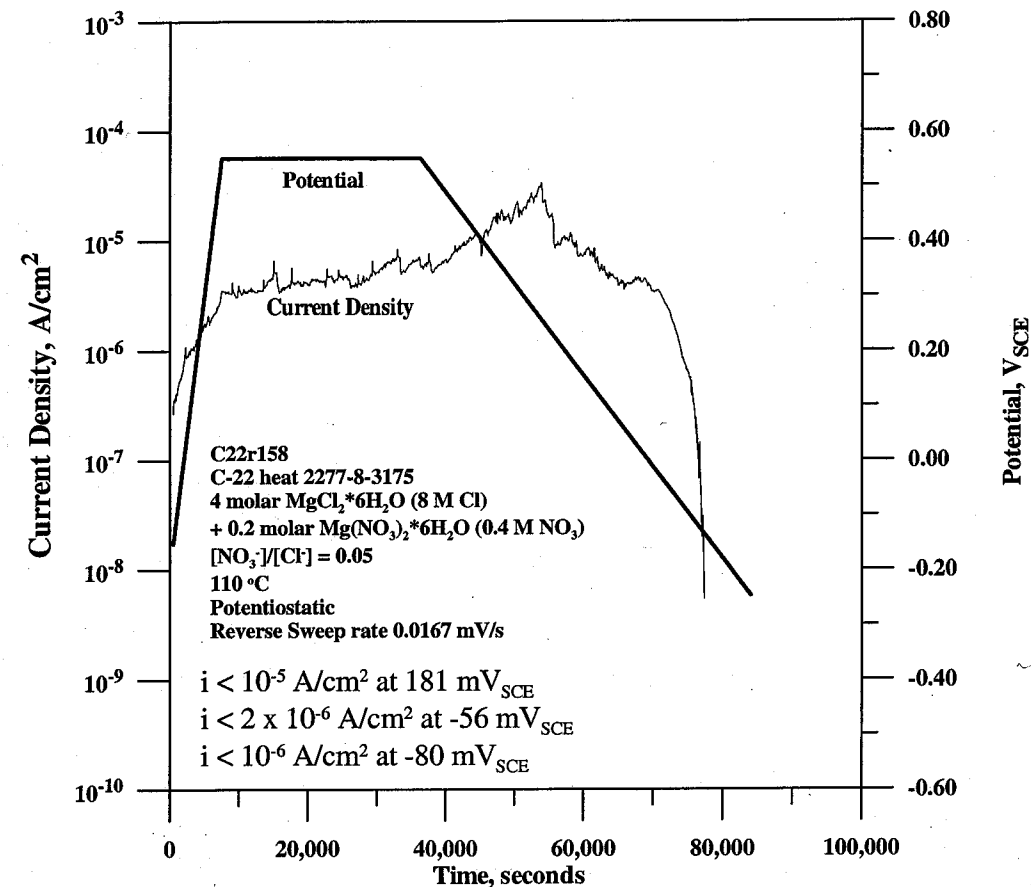
Date

Recorded by

Chung-che Wu

7/24/03

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To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

Chung-che Wu

7/30/03

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Repassivation Potential of C-22 Alloy

Objective : Same as pg. #2

Specimen : Alloy C-22 2277-8-3175 Polished to a 600 Grit finish with 2 PTFE crevice washers attached at 50 in-oz using Proto #6104 SN# 139072
Cal 3/6/03 Due 9/6/03

Start wt. : 40.17375 g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt. : 40.03485 g

Solution : 8M of Cl⁻ + DI water to 2000 mL
850.25 g of Mg(Cl)₂·6H₂O Lot # 004768
391.39 g of Mg(Cl)₂·6H₂O Lot # 000036
211.86 g of Mg(Cl)₂·6H₂O Lot # 4609478
174.09 g of Mg(Cl)₂·6H₂O Lot # 936846 } Total = 1627.59 g

pH Start : 5.166 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End : 5.784 pH Probe # 13-620-296 SN# 2291257P 6

Potentiostat : EG & G Model # 273A SN# 10120

Counter Electrode : Pt Flag

Reference : Fisher 13-620-52 SN# 0249092

Temperature : 110°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

E_{corr} = -0.280V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = -0.211V

Solution Deaerated with 99.999% N₂

Specimen Examination : Severe crevice corrosion observed. 1 1/24 feet of crevice washer
Heavy deposits and surface staining. Localized corrosion on open surface.

Data : C22R159 To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

7/24/03

Chung Che Wu

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Current Density, A/cm²

Potential, V_{SCE}

C22r159
C-22 heat 2277-8-3175
4 molar MgCl₂·6H₂O (8 M Cl)
[NO₃]⁻/[Cl]⁻ = 0.0
110 °C
Potentiostatic
Reverse Sweep rate 0.0167 mV/s

$i < 10^{-5}$ A/cm² at -224 mV_{SCE}
 $i < 2 \times 10^{-6}$ A/cm² at -247 mV_{SCE}
 $i < 10^{-6}$ A/cm² at -255 mV_{SCE}

Time, seconds

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

7/30/03

Chung Che Wu

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Repassivation of Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C22 2277-8-3175 Polished to a 600 Grit finish with 2 PTFE attached ^{7/25/03} crevice washers attached at 50 in-03 using Proto #6104
SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt. 40.33165 g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt. 40.33154 g

Solution: 8M of Cl^- + 2M NO_3^- + DI water to 2000 mL
1626.77g of $Mg(Cl)_2 \cdot 6H_2O$ Lot# 030073
512.97g of $Mg(NO_3)_2 \cdot 6H_2O$ Lot# 033942

pH Start: 3.763 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH End: 4.075 pH Probe #13-620-296 SN# 2291257P 6

Potentiostat: EG & G Mode #273 SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 80°C Hg Thermometer SN# 2000-123 Cal 3/27/03 Due 9/27/03

$E_{corr} = -0.173V$ Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
 $E_{PT} = +0.382V$

Solution Deaerated with 99.999% N_2

Specimen Examination: No sign of crevice corrosion. $\frac{1}{4}$ feet of crevice washer.
No surface staining.

Note: Sample Repolished for further testing.

Data: C22R160 To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

Chung Che Win

7/28/03

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$i < 10^{-5} A/cm^2$ at 550 mV_{SCE}
 $i < 2 \times 10^{-6} A/cm^2$ at 550 mV_{SCE}
 $i < 10^{-6} A/cm^2$ at 550 mV_{SCE}

C22r160
C-22 heat 2277-8-3175
4 molar $MgCl_2 \cdot 6H_2O$ (8 M Cl)
+ 1 molar $Mg(NO_3)_2 \cdot 6H_2O$ (2 M NO_3)
 $[NO_3^-]/[Cl^-] = 0.25$
80 °C
Potentiostatic
Reverse Sweep rate 0.0167 mV/s

Current Density, A/cm²

Potential, V SCE

Time, seconds

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

Chung Che Win

7/30/03

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Repassivation Potential of C22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C22 2277-8-3175 Polished to a 600 grit finish with 2
PTFE Crevice washers attached at 50 in-oz using Proto # 6104
SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.24616g Sartorius Genius SN# 12809099
End wt.: 40.24848g Cal 5/15/03 Due 11/15/03

Solution: 8 M of Cl^- + 1.6 M of NO_3^- + DI water to 2000 ml
1374.87g of $Mg(Cl)_2 \cdot 6H_2O$ Lot # 030073 }
251.75g of $Mg(Cl)_2 \cdot 6H_2O$ Lot # 028490 } total 1626.62g
410.49g of $Mg(NO_3)_2 \cdot 6H_2O$ Lot # 033942

pH Start: 3.855 Fisher Accumet 950 Meter SN# 3340 Cal 8/9/02 Due 8/7/03
pH End: 4.354 pH Probe #13-620-296 SN# 2291257P6

Potentiostat: EG & G Model #273A SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 80°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

$E_{corr} = -0.135V$ Keithley 614 SN# 467374 Cal ~~10/28/02~~ Due 10/28/03
 $E_{ref} = +0.053V$ 10/28/02 DP 9/21/04

Solution Deaerated with 99.999% N_2

Specimen Examination: No sign of crevice corrosion. $\frac{1}{4}$ feet of crevice washer.
No surface staining.

Note: Sample repolished for further testing.

Data: C22R161

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

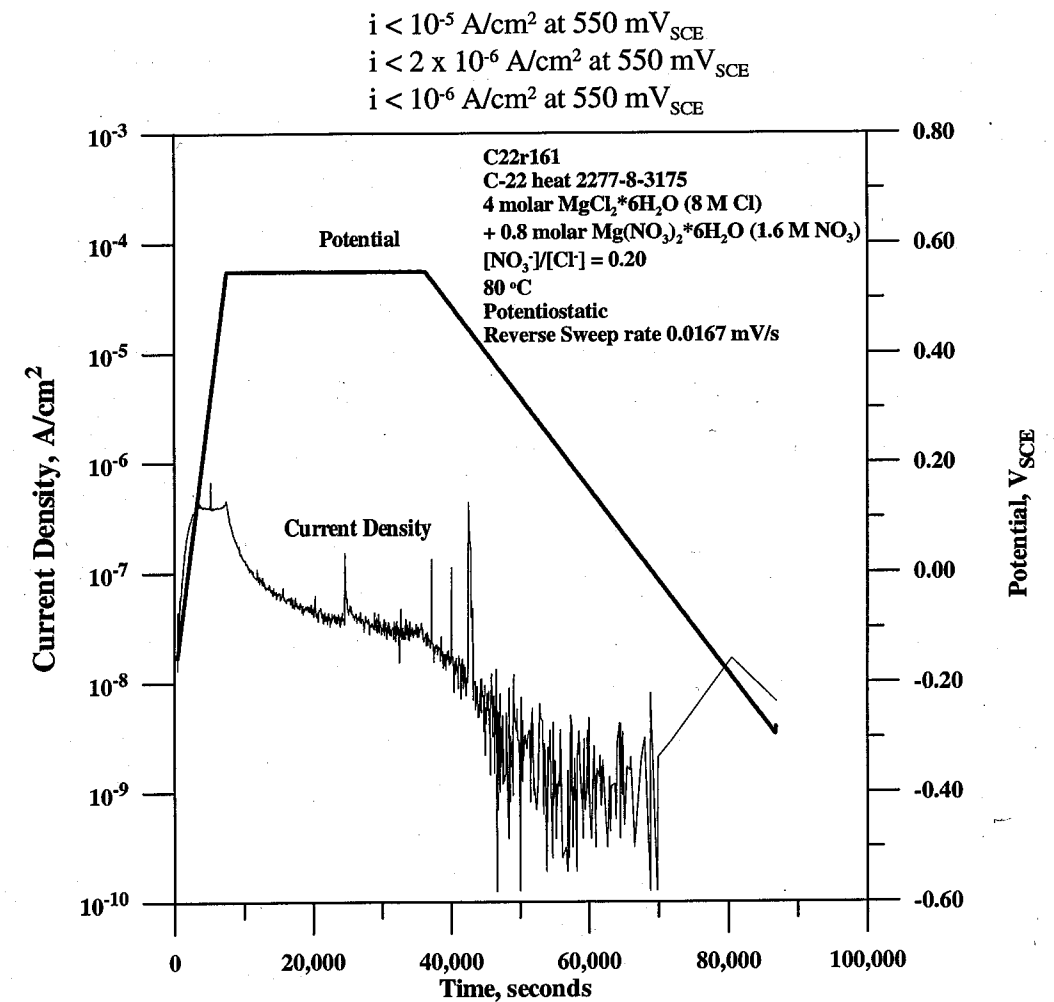
Date _____

Recorded by _____

7/28/03

Chung Che Wu

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

7/30/03

Chung Che Wu

From Page No. _____

Repassivation Potential of Alloy C22

Objective: Same as page #2

Specimen: Alloy C22 2277-8-3175 Polished to a 600 Grit finish with 2 PTFE Crevice Washers attached at 50 in-oz using Protq #6104 SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.14136g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.14152g

Solution: 8M of Cl⁻ + 1.2M of NO₃⁻ + DI water to 2000ml
1626.61g of MgCl₂·6H₂O Lot # 028490
309.79g of Mg(NO₃)₂·6H₂O Lot # 033942

pH Start: 4.602 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03
pH End: 4.662 pH Probe #13-620-296 SN# 2291257P6

Potentiostat: EGI & E Model #273 SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 80°C Hg Thermometer SN#2000-123 Cal 3/27/03 Due 9/27/03

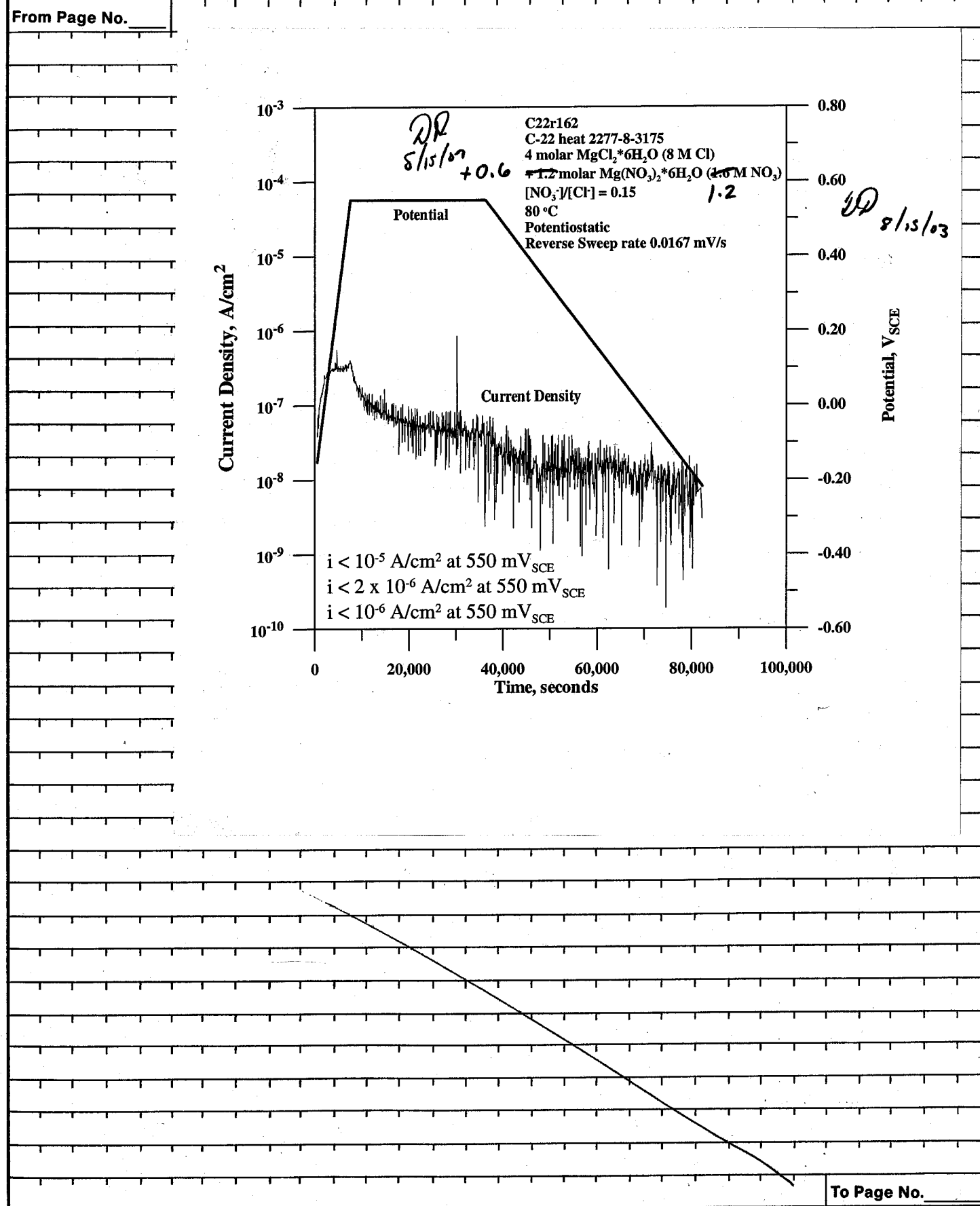
E_{corr} = -0.215 V Keithley 614 SN#467374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.292 V

Solution Deaerated with 99.999% N₂

Specimen Examination: No sign of corrosion. 1/4 feet of crevice washer. No surface staining.

Note: Sample repolished for further testing. Data: C22R162 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung-Phe Wu</i>	7/30/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>[Signature]</i>	8/15/03

From Page No. _____

Repassivation Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2 PTFE Crevice washers attached at 50 in-o2 using Proto #6104
SN# 139072 Cal 3/6/03 Due 9/6/03

Start wt.: 40.33925g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.33936g

Solution: 8M of Cl^- + 0.8M of NO_3^- + DI water to 2000 mL
1138.4g of $Mg(Cl)_2 \cdot 6H_2O$ Lot # 028490 } Total of 1626.65g
488.25g of $Mg(Cl)_2 \cdot 6H_2O$ Lot # 030320 }
205.24g of $Mg(NO_3)_2 \cdot 6H_2O$ Lot # 033942

Start pH: 4.363 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03
End pH: 4.705 pH Probe #13-620-296 SN#2291257P6

Potentiostat: EG & G Model # 273A SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-32 SN# 0249092

Temperature: 80°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

$E_{corr} = -0.276V$ Keithley 614 SN#467374 Cal 10/28/02 Due 10/28/03
 $E_{PT} = +0.229V$

Solution Deaerated with 99.999% N_2

Specimen Examination: No sign of crevice corrosion. 1/24 feet of crevice washer.
No surface staining.

Note: Sample repolished for further testing. Data: C22R163 To Page No. _____

Witnessed & Understood by me,

Date

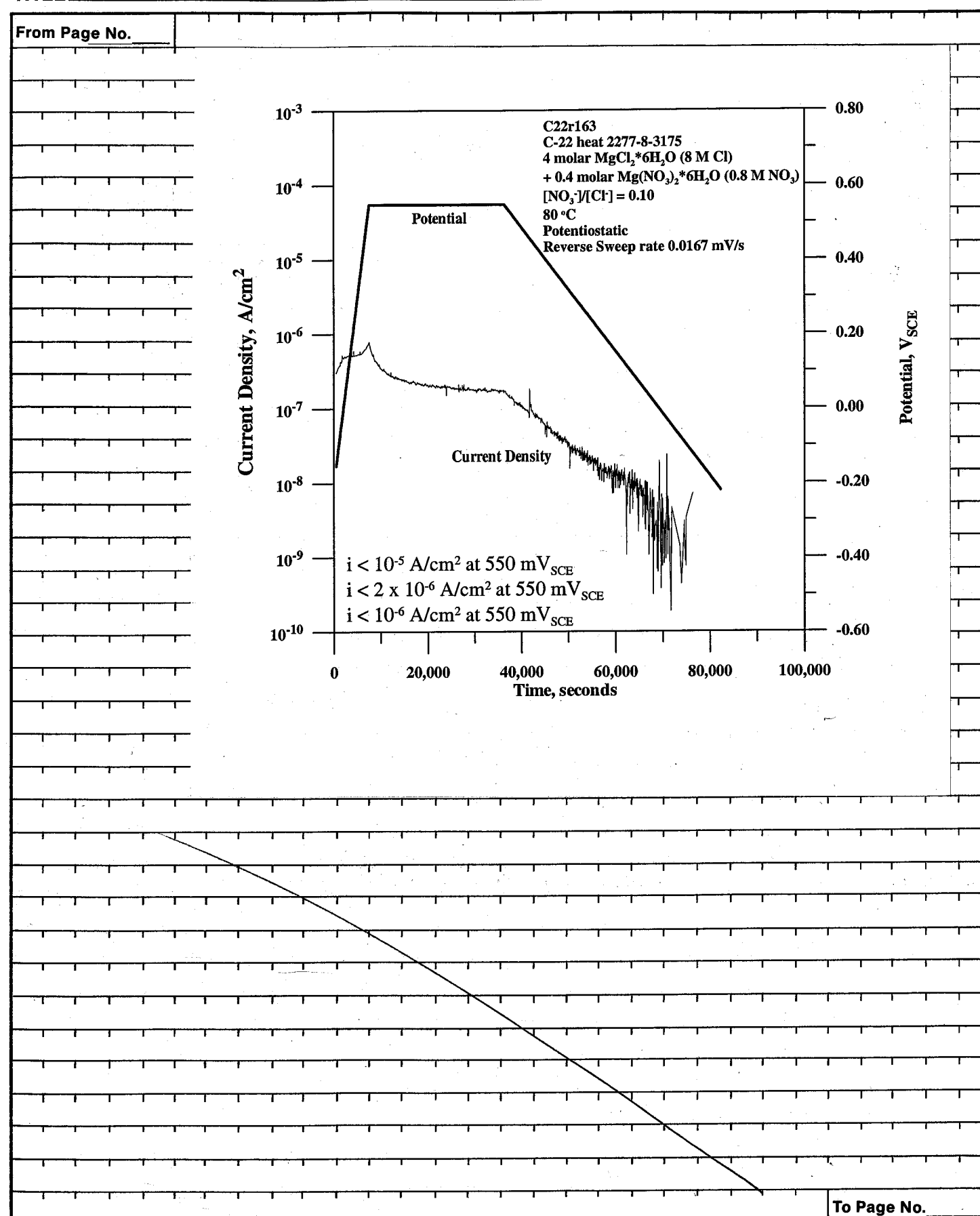
Invented by

Date

Recorded by

7/30/03

Chung-Che Wu



Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

8/15/03

From Page No. _____

OCP versus Temp. of Alloy C-22

Objective: To know the effect of temperature on the open circuit potential of C22 Alloy.

Specimens: 3 Alloy C-22 Cylinders 2277-8-3175 polished to a 600 Grit finish.
Immersed in Nitric Acid for 10 minutes.

Specimen #1	Specimen #2	Specimen #3
Start wt.: 12.76110 g	Start wt.: 12.22932 g	Start wt.: 12.74101 g
End wt.: 12.76000 g	End wt.: 12.74098 g	End wt.: 12.74098 g
Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03		

Solution: 0.028M of Cl^- + DI water + HCl to 2000 mL + pH=3
3.279 g of NaCl Lot# 028794
170 mL of 20% HCl solution Lot# 023844

Start pH: 5.679 ; pH adjusted to 3.074 Fisher Accumet 950 Meter SN#3340 Cal 8/9/02 Due 8/9/03
End pH: 3.208
pH probe #13-620-296 SN# 2291257P6

Counter Electrode: Pt Flag

Reference: Fisher Accumet #13-620-296 SN# 8205244
7/29/03 CW
32

Temperature: from 95°C to 25°C Hg Thermometer SN#C96-852 Cal 6/3/03 Due 12/3/03

$E_{corr} \#1 = +0.059 V$ $E_{corr} \#2 = -0.070 V$ $E_{corr} \#3 = -0.006 V$
 $E_{PT} = +0.492 V$ Keithley 614 SN#467374 Cal 10/28/02 Due 10/28/03

Solution Saturated with Air

Specimens Examination: All specimens showed no sign of corrosion. No surface staining.

Note: E_{corr} and E_{PT} measured with Keithley 614 agree with values measured by data acquisition system.

Note: Specimens repolished for further testing.

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

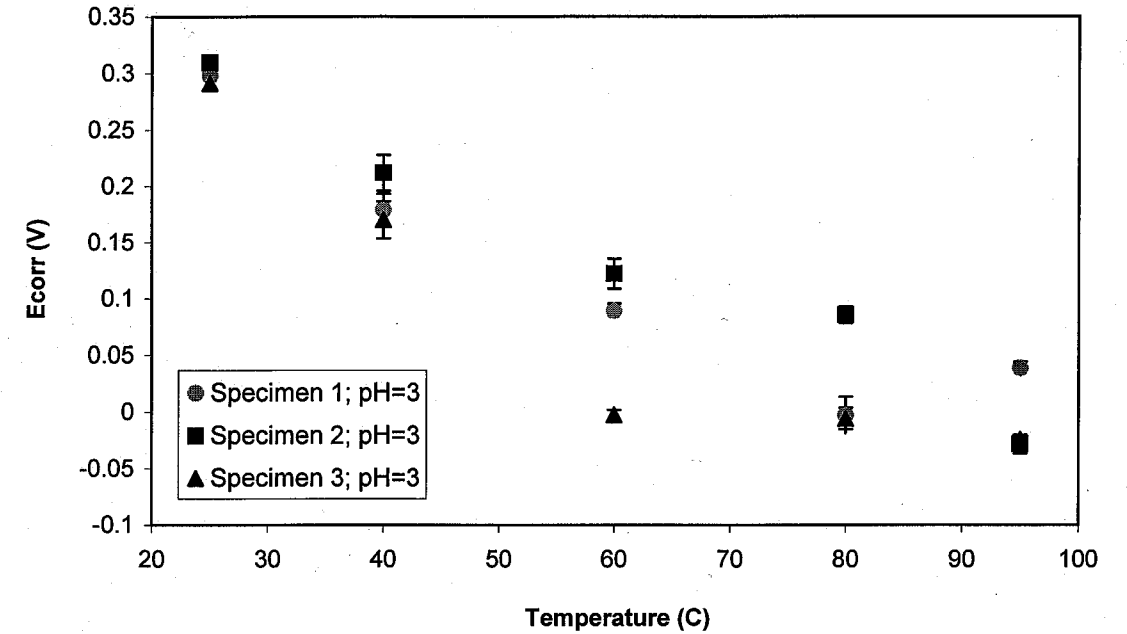
Date

Recorded by

Ching Che Wen

7/29/03

From Page No. _____



To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

Ching Che Wen

8/11/03

From Page No. _____

OCP versus Temp of Alloy C-22

Objective: To understand the effect of temperature on open circuit potential of Alloy C-22.

Specimens: 3 Alloy C-22 Cylinders 2297-8-3175 Polished to a 600 grit finish.
Immersed in Nitric Acid for 10 minutes.

Specimen #4	Specimen #5	Specimen #6
Start wt.: 12.37198g	Start wt.: 12.73471g	Start wt.: 12.41449g
End wt.: 12.37566g	End wt.: 12.73474g	End wt.: 12.41369g
Sartorius Genius SN# 12809099	Cal 5/15/03	Due 11/15/03

Solution: 0.028M of Cl^- + DI Water + NaOH to 2000ml \downarrow pH=12
 3.282g of NaCl Lot# 028794
 20.5 ml of 1.0M NaOH Lot# 897895

Start pH: 5.676 ; pH adjusted to 12.004 pH Probe #13-620-296 SN#2291257P 6
 End pH: 11.783 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03

Counter Electrode: Pt Flag

Reference: Fisher Accumet #13-620-52 SN# 00042119

Temperature: from 95°C to 25°C Hg Thermometer SN# H98-170 Cal 4/29/03 Due 4/29/04

E_{corr} #4 = -0.186V E_{corr} #5 = -0.191V E_{corr} #6 = -0.347V
 E_{pT} = +0.071V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03

Solution Saturated with Air

Specimens Examination: All specimens showed no sign of corrosion. No surface staining.

Note: E_{corr} and E_{pT} measured with Keithley 614 agree with values measured by data acquisition system.

Note: Specimens repolished for further testing.

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

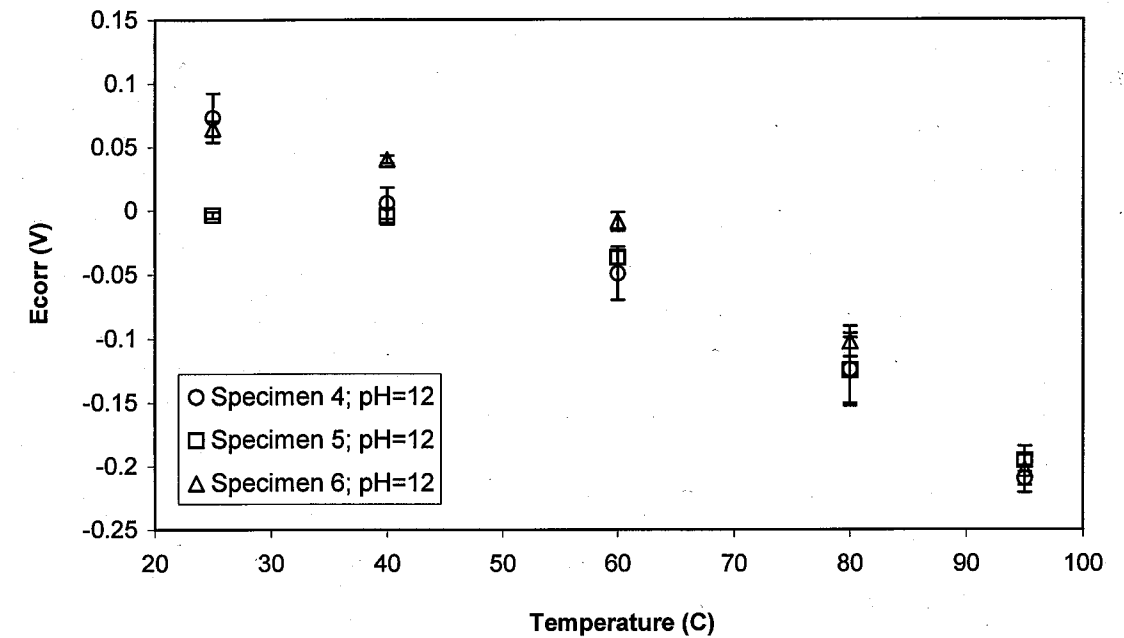
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Chung-Chie Wen

7/29/03

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From Page No. _____



To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

Chung-Chie Wen

8/11/03

From Page No. _____

Repassivation Potential of C-22 Alloy

Objective: Same as pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit finish with 2 PTFE crevice washers attached at 50 in-oz using Proto #6104 SN# 139072
Cal 3/6/03 Due 9/6/03

Start wt.: 40.39330g Sartorius Genius SN# 12809099 Cal 5/15/03 Due 11/15/03
End wt.: 40.39338g

Solution: 8M of Cl⁻ + 0.4M of NO₃⁻ + DI water to 2000 ml
1626.69g of Mg(Cl)₂·6H₂O Lot # 030320
192.69g of Mg(NO₃)₂·6H₂O Lot # 033942

Start pH: 4.389 Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
End pH: 4.861 pH Probe #13-620-296 SN# 2291257P6

Potentiostat: EG & G Model # 273 SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0251439

Temperature: 80°C Hg Thermometer SN# C96-377 Cal 7/15/03 Due 1/15/04

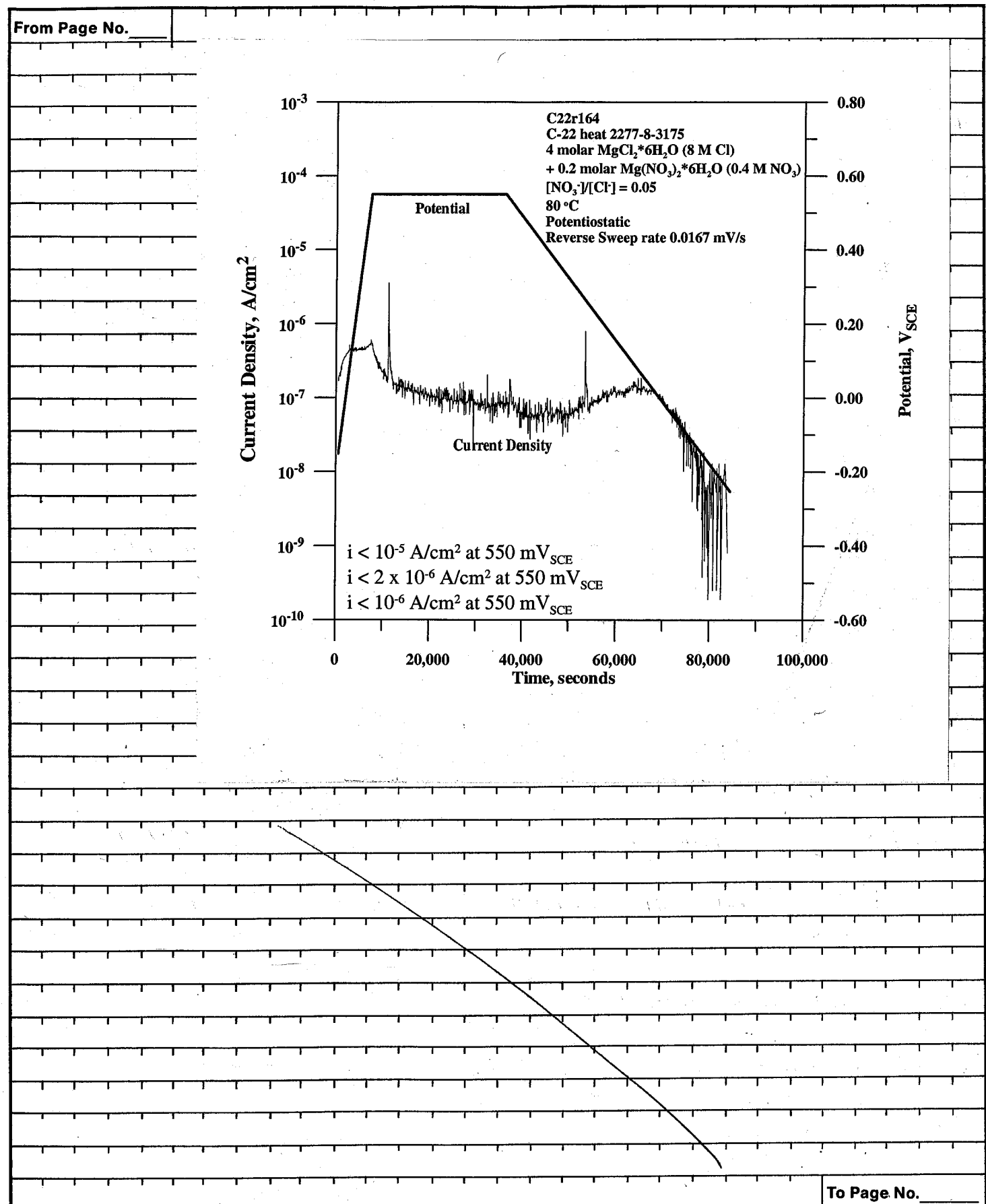
E_{corr} = -0.240V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.365V

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice corrosion observed. 7/24 feet of crevice washer.
No surface staining.

Data: C22R164 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung-Che Wu</i>	7/31/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>[Signature]</i>	8/15/03

From Page No. _____

Repassivation Potential of C-22 Alloy

Objective: See pg. #2

Specimen: Alloy C-22 2277-8-3175 Polished to a 600 grit Finish with 2 PTFE Crevice washers attached at 50 in-oz using Proto #6104 SN#139072
Cal 3/6/03 Due 9/6/03

Start wt.: 40.21153 g Sartorius Genius SN#12809099 Cal 5/15/03 Due ^{7/31/03} 11/15/03
End wt.: 40.12512 g

Solution: 8 M of Cl⁻ + DI water to 2000 ml
900.14 g of MgCl₂·6H₂O Lot # 030320 } 1626.58 g total
726.44 g of MgCl₂·6H₂O Lot # 030073 }

Start pH: 4.530 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03
End pH: 5.668 pH Probe #13-620-296

Potentiostat: EG & G Model #273A SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#0249092

Temperature: 80°C Hg Thermometer SN# C98-106 Cal 5/1/03 Due 5/1/04

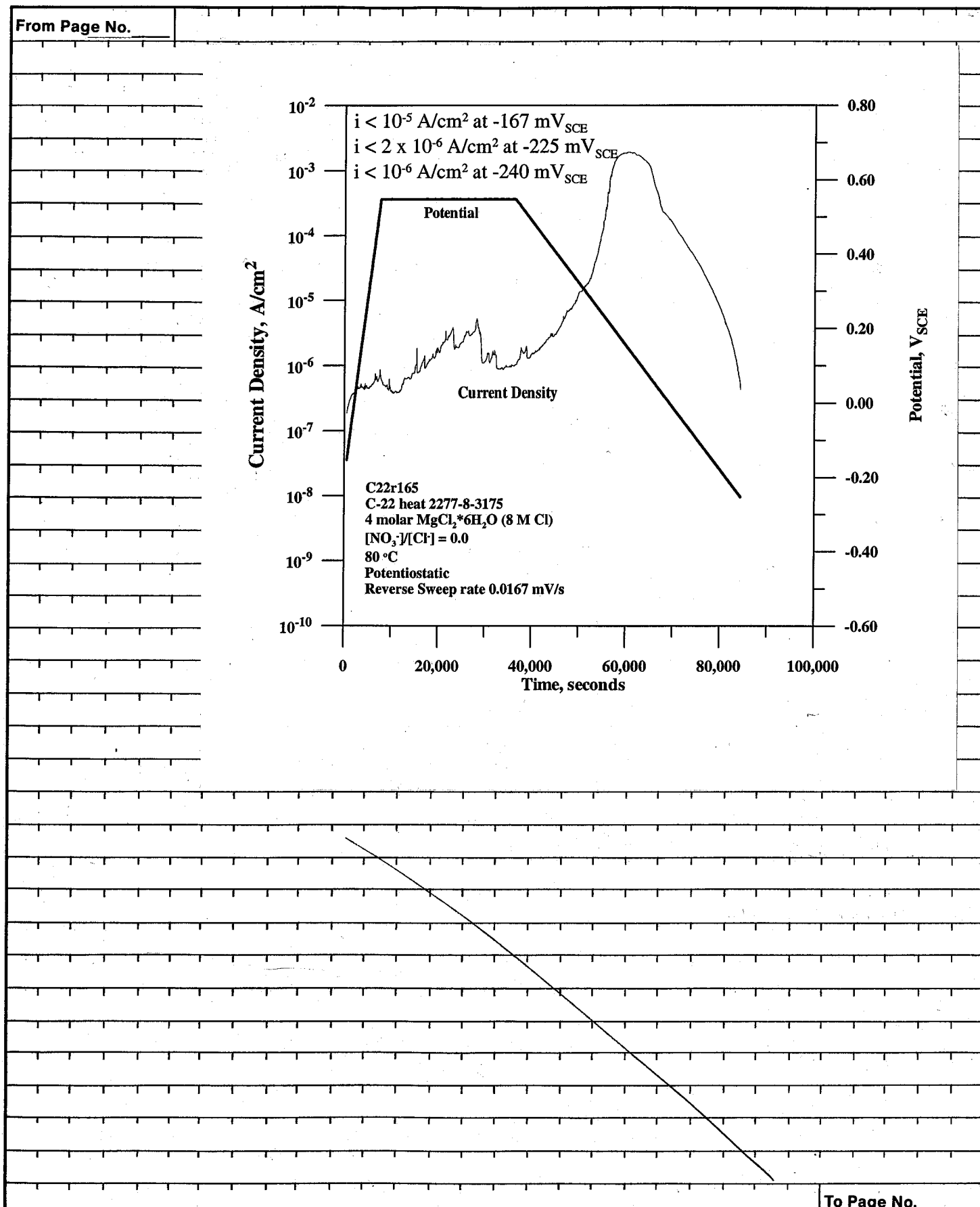
E_{corr} = -0.238 V Keithley 614 SN#461374 Cal 10/28/02 Due 10/28/03
E_{PT} = +0.286 V

Solution Deaerated with 99.999 % N₂

Specimen Examination: Crevice corrosion observed. 1/24 feet of crevice washer.
No surface staining.

Data: C22R165 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Cheng Che Wu</i>	7/31/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>[Signature]</i>	8/15/03

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OCP Versus Temp of Alloy C-22

Objective: To understand the effect of temperature on the open circuit potential of C-22 Alloy.

Specimens: 3 Alloy C-22 Cylinders 2277-8-3175 Polished to a 600 grit finish.
Immersed in Nitric Acid for 10 minutes.

Specimen #1	Specimen #2	Specimen #3
Start wt.: 12.40784g	Start wt.: 12.72909g	Start wt.: 12.74932g
End wt.: 12.40587g	End wt.: 12.73038g	End wt.: 12.74997g
Sartorius Genius SN# 12809099	Cal 5/15/03	Due 11/15/03

Solution: 0.0869M KCl + 0.0171M NaCl + 0.103M NaNO₂ + 0.146M Na₂SO₄ +
1.15M NaHCO₃ + 0.0736M NaF + DI water to 2000 mL

12.995g of KCl Lot# 005573
10.904g of NaCl Lot# 028794
17.549g of NaNO₂ Lot# 020809
41.395g of NaNO₃ Lot# 025157
6.227g of NaF Lot# 991559
192.71g of NaHCO₃ Lot# 025478

Start pH: 7.806 ; Note: pH measured without complete dissolving salts.
End pH: 9.850

Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH Probe # 13-620-296 SN# 2291257P6

Counter Electrode: Pt Flag

Reference: Fisher Accumet #13-620-52 SN# 8205244

Temperature: From 95°C ~ 25°C Hg Thermometer SN# C96-852 Cal 6/3/03 Due 12/3/03

E_{corr} #1 = -0.230V E_{corr} #2 = -0.222V E_{corr} #3 = -0.225V
E_{pT} = +0.060V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03

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Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung-Che Wu</i>	8/6/03

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Solution Saturated with Air

Specimen Examination: No sign of corrosion. No surface staining.

Note: E_{corr} and E_{pT} measured with Keithley 614 agree with values measured by data acquisition system.

Temperature (C)	Specimen 1; pH=8 (V)	Specimen 2; pH=8 (V)	Specimen 3; pH=8 (V)
25	-0.05	-0.06	-0.04
40	-0.07	-0.08	-0.05
60	-0.12	-0.13	-0.08
80	-0.19	-0.21	-0.14
95	-0.32	-0.33	-0.28

Note: Specimens repolished for further testing

E_{corr} Temp 3

To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung-Che Wu</i>	8/15/03

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OCP Versus Temp of Alloy C-22

Objective: To understand the effect of temperature on the corrosion potential of Alloy C-22

Specimens: 3 cylindrical Alloy C-22 specimen ~~2118~~ 3195 Polished to a 600 grit finish. Immersed in Nitric Acid for 10 minutes.

Specimen #4	Specimen #5	Specimen #6
Start wt.: 12.72449 g	Start wt.: 12.22016 g	Start wt.: 12.36325 g
End wt.: 12.72466 g	End wt.: 12.22234 g	End wt.: 12.36092 g
Sartorius Genius SN# 12809099	Cal 5/15/03	Due 11/15/03

Solution: 2.32 M KCl + 2.69 M NaCl + 0.085 M NaF + 2.86 M NaNO₃ + 0.176 M Na₂SO₄ + 1.786 M Na₂CO₃ + DI water to 2000 ml

345.99 g of KCl Lot # 005573
314.45 g of NaCl Lot # 028794
486.20 g of NaNO₃ Lot # 020809
50.03 g of Na₂SO₄ Lot # 025157
378.64 g of Na₂CO₃ Lot # 990437
7.183 g of NaF Lot # 991559

Start pH: 11.070, Note: Salts were not completely soluble ∴ pH may vary.
End pH: 10.703

Fisher Accumet 950 Meter SN# 3340 Cal 8/7/02 Due 8/7/03
pH Probe #13-620-296 SN# 2291257P 6

Counter Electrode: Pt Flag

Reference: Fisher Accumet #13-620-52 SN# 00042119

Temperature: From 95°C ~ 25°C Hg Thermometer SN# H98-170 Cal 4/29/03 Due 4/29/04

E_{corr} #4 = -0.238V E_{corr} #5 = -0.208V E_{corr} #6 = -0.246V
E_{pT} = -0.083V Keithley 614 SN# 467374 Cal 10/28/02 Due 10/28/03

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Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung Che Wen</i>	8/6/03

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Solution Saturated with Air

Specimen Examination: No sign of corrosion. light gold staining.

Note: E_{corr} and E_{pT} measured with Keithley 614 agree with values measured by data acquisition system.

Temperature (C)	Specimen 4; pH=11 (V)	Specimen 5; pH=11 (V)	Specimen 6; pH=11 (V)
25	-0.08	-0.08	-0.04
40	-0.10	-0.10	-0.05
60	-0.13	-0.13	-0.08
80	-0.19	-0.12	-0.12
95	-0.22	-0.18	-0.15

Note: Specimens repolished for further testing.

To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung Che Wen</i>	8/15/03

From Page No. _____

CPP Test of 316L

Objective: Determine E_{pt} & E_{rp} from CPP test.

Specimen: 316L (P80746) polished to a 600 grit finish with 2 PTFE crevice washers attached at 50-in-oz using Proto 6104 SN#139072 Cal 3/6/03 Due 9/6/03

Start wt.: 31.18375g Sartorius Genius SN#12809099 Cal 5/15/03 Due 11/15/03
End wt.: 31.16791g

Solution: 5.5 M of Cl^- + DI water to 2000ml
642.97g of NaCl Lot# 028794

pH Start: 8.715 Fisher Accumet 950 Meter SN#3340 Cal 8/7/02 Due 8/7/03
pH End: 7.623 pH Probe #13-620-296 SN# 2291257P6

Potentiostat: ~~EG&G~~ ^{8/7/03 EW} Model = Solatron 1480 SN#00240053 Cal 8/1/03 Due 2/1/04

Counter Electrode: Pt Flag

Reference: Accumet 13-620-52 SN#0052116

Temperature: 100°C Hg Thermometer SN# H98-179 Cal 4/29/03 Due 4/29/04

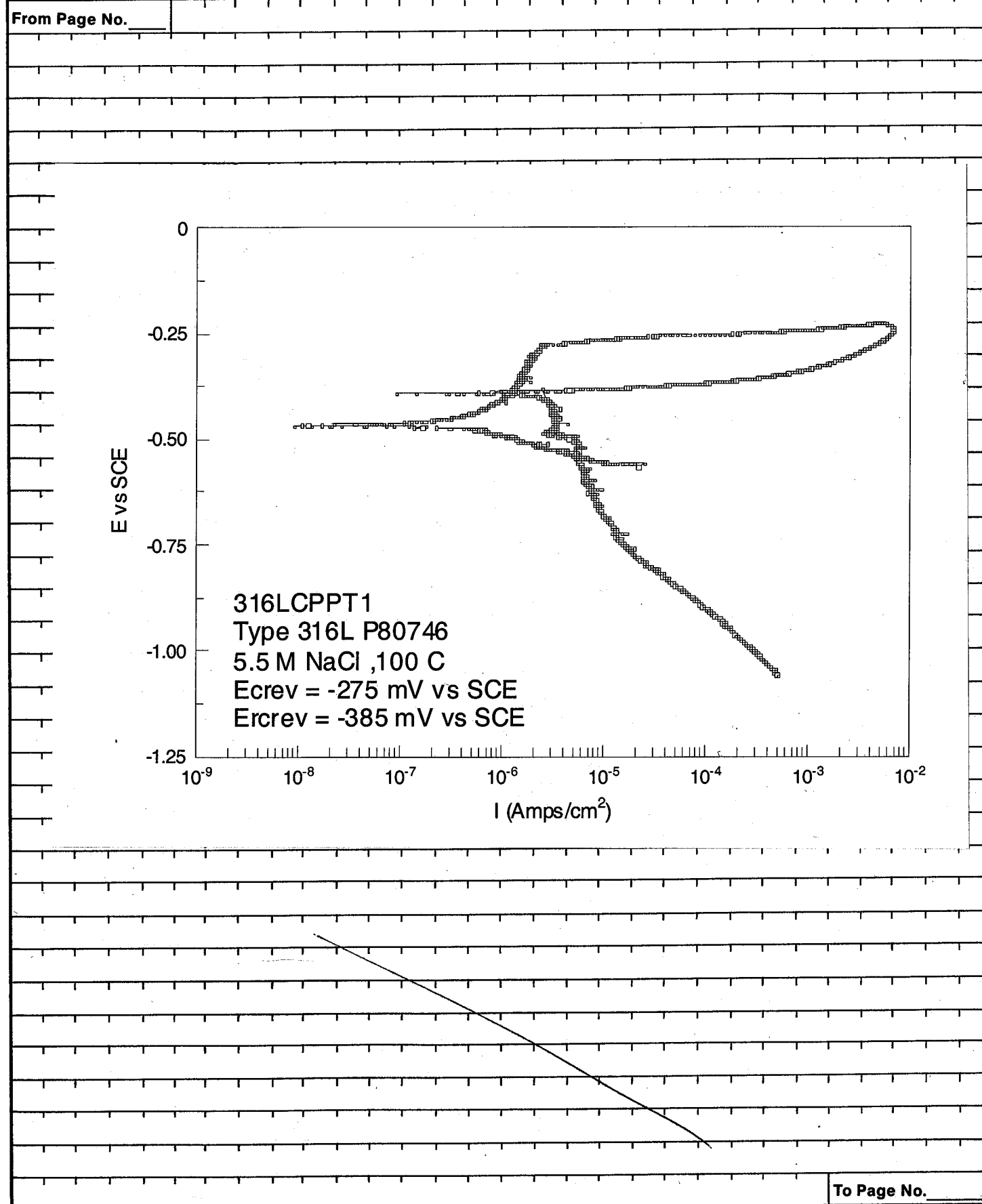
E_{corr} = -0.357V Keithley 614 SN#467374 Cal 10/28/02 Due 10/28/03
 E_{PT} = -0.081V

Solution Deaerated with 99.999% N_2

Specimen Examination: Corrosion observed - 23/24 feet of crevice washer.
Transpassive dissolution.

Data: 316LCPT1 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung-Che Wu</i>	8/7/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>Chung-Che Wu</i>	8/7/03

From Page No. _____

CPP Test of 625 Alloy

Objective: Determine Epit & Ecp from CPP Test.

Alloy / Heat No.: 625 Alloy / NX9936A6

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: 3/6/03 Due: 9/6/03

Initial Weight: 31.25018g Model: Sartorius Genius SN: 12809099
Final Weight: NOT RECORDED Cal: 5/15/03 Due: 11/15/03

Solution: 5.5M of Cl⁻ + DI water to 2000ml
642.95g of NaCl Lot # 028794

Reagents measured with Model: OHAUS SN: 2883 Cal: 7/29/03 Due: 1/29/04

Initial pH: 8.812 Model: Fisher Accumet 950 Meter SN: 3340
Final pH: 7.424 Cal: 8/9/02 Due: 8/9/03
pH Probe: #13-620-296 SN: 2291257P6

Test Temperature: 100°C Measured with Hg Thermometer SN: H98-119 Cal: 4/29/03 Due: 4/29/04

Counter Electrode: Platinum Flag

Reference Electrode: Accumet 13-620-52 SN# 0052116 SN: _____

Gas: 99.999 % N₂

Ecorr: -0.180V Model: Keithley 614 SN: 467374
Ept: -0.146V Cal: 10/28/02 Due: 10/28/03

Potentiostat: Solartron 1480 SN# 00240053
Last Verification Date: 8/1/03 Verification Due: 2/1/04

Number of Crevice Corrosion Sites: 4 / 24 (24 max.)

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

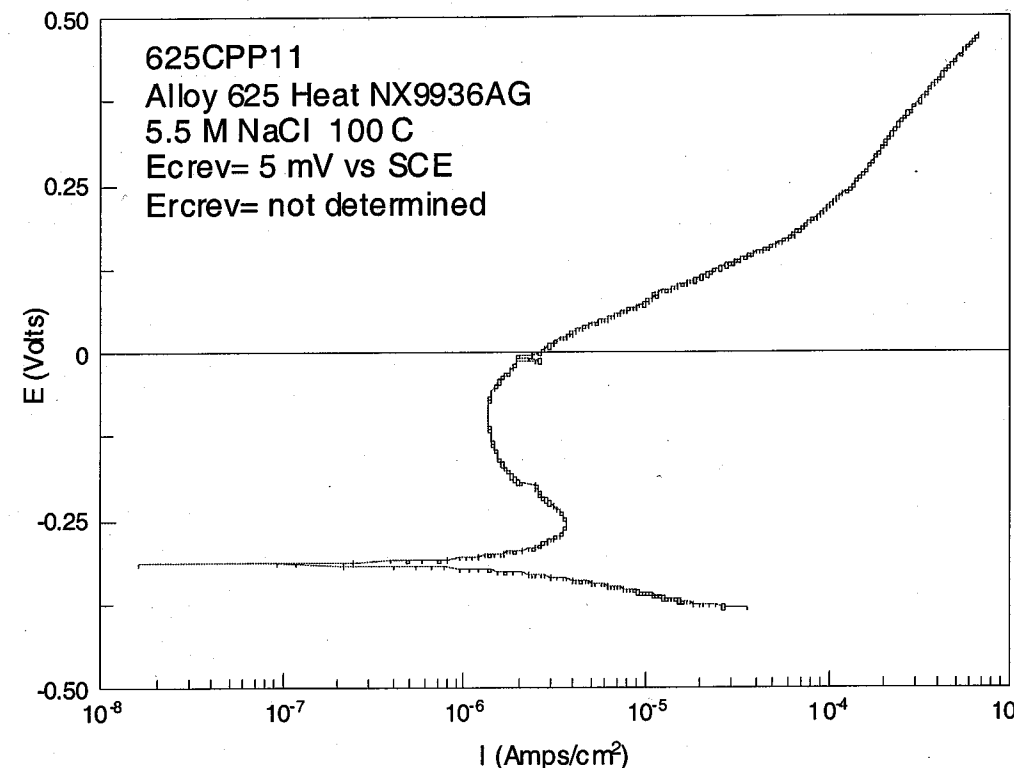
Date _____

Recorded by _____

8/9/03

Chung-Hee Wu

From Page No. _____



Multiple tests using 625 specimen and 1480 potentiostat. Problems with Potentiostat Drivers prevented completion of test

New drivers will be installed prior to additional tests on this system

Specimens will be repolished and used in future tests

Partfiles 625CPPT 1, 2, 3, 5, 6, 7, 8, 9, 10, 11

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

8/15/03

[Signature]

CPP Test of Alloy C-22

Objective: DETERMINE E_p & E_{rp} USING CPP

Alloy / Heat No. : C-22/2277-8-3175

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 Due: 9/6/03
Cal: 3/6/03

Initial Weight: 40.35861 Model: Sartorius Genius SN: 12809099
Final Weight: 40.33891 Cal: 5/15/03 Due: 11/15/03

Solution: 5.5 M NaCl
642.93 g NaCl LOT 028794
+ DI WATER TO 2000 mL

Reagents measured with Model: OHAUS SN: 2883 Due: 1/29/03
Cal: 7/29/03

Initial pH: 8.781 Model: Fisher Accumet 950 Meter SN: 3340
Final pH: 7.424 Cal: 8/11/03 Due: 8/11/04
pH Probe: #13-620-296 SN: 2291257P6

Test Temperature: 100°C Measured with Hg Thermometer SN: 498-179 Due: 4/29/04
Cal: 4/29/03

Counter Electrode: Platinum Flag

Reference Electrode: 13-620-52 FISHER SCE SN: 0052116

Gas: 99.999% N₂

Ecorr: -376 Model: KENTMUSY 614 SN: 0704934
Ept: -102 Cal: 6/9/03 Due: 8/19/04

Potentiostat: SOLARTRON 1450 SN 00240053
Last Verification Date: 8/1/03 Verification Due: 2/1/04

Number of Crevice Corrosion Sites: 23/24 (24 max.)

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

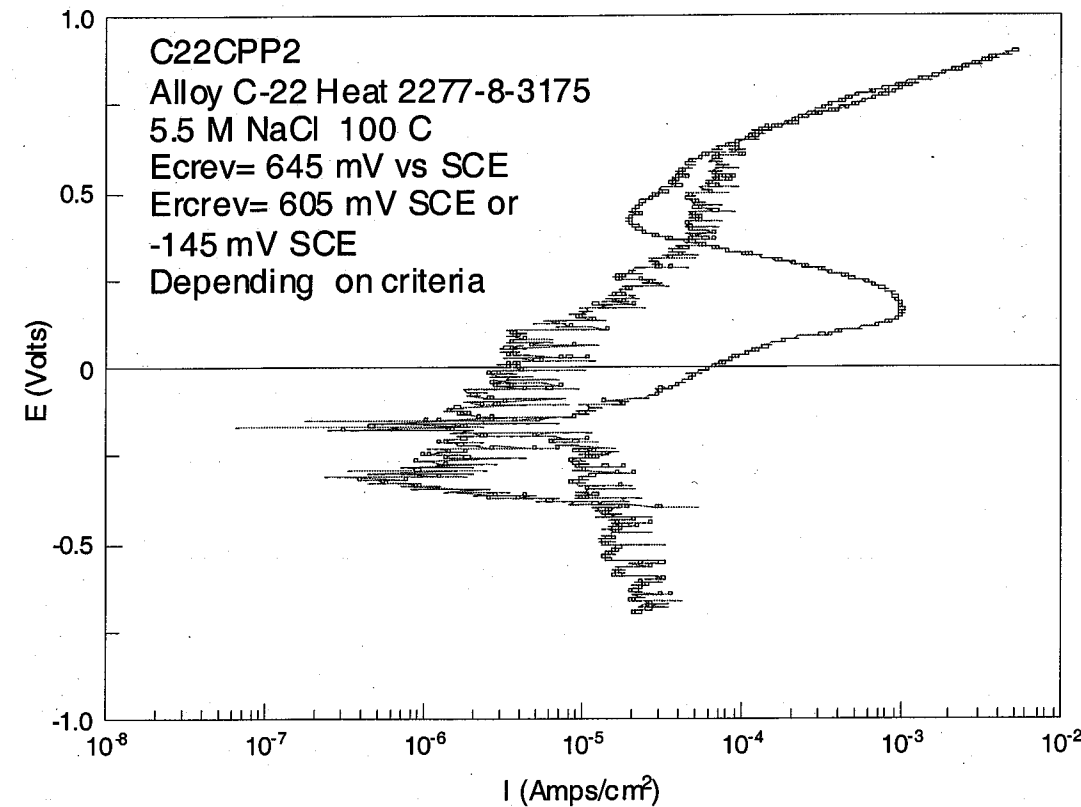
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Recorded by

[Signature]

8/15/03

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Initial test C22CPP1.DAT Run on 1450 potentiostat. Run was not complete due to problems with system.

*C22CPP2 Run using EG&G 263A potentiostat SN 66105
verified 5/1/03 verification due 11/1/03*

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

[Signature]

8/15/03

From Page No. _____

Objective: *Determine E_p & E_{rp}*

Alloy / Heat No.: *825 HH4371FG*

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: Prbto #6104 SN: 139072
Cal: 3/6/03 Due: 9/6/03

Initial Weight: *36.60241* Model: Sartorius Genius SN: 12809099
Final Weight: *36.57701* Cal: 5/15/03 Due: 11/15/03

Solution: *5.5 M NaCl*
6437 NaCl LOT 028794

Reagents measured with Model: OHAUS SN: 2883
Cal: 7/29/03 Due: 1/29/03

Initial pH: *8.49* Model: Fisher Accumet 950 Meter SN: 3340
Final pH: *7.58* Cal: *8/11/03* Due: *8/11/04*
pH Probe: #13-620-296 SN: 2291257P6

Test Temperature: *100°C* Measured with Hg Thermometer SN: *H98-179*
Cal: *4/29/03* Due: *4/29/04*

Counter Electrode: Platinum Flag

Reference Electrode: *13-620-52 FISHER SCE* SN: *0052116*

Gas: *97.999 % N₂*

Ecorr: *-299 mV SCE* Model: *KEITHLEY 614* SN: *0704934*
Ept: *-195 mV SCE* Cal: *4/9/03 UP 6/9/03* Due: *6/9/04*
8/12/03

Potentiostat: *SOLARTRON 1480* SN *00240053*

Last Verification Date: *8/1/03* Verification Due: *2/1/04*

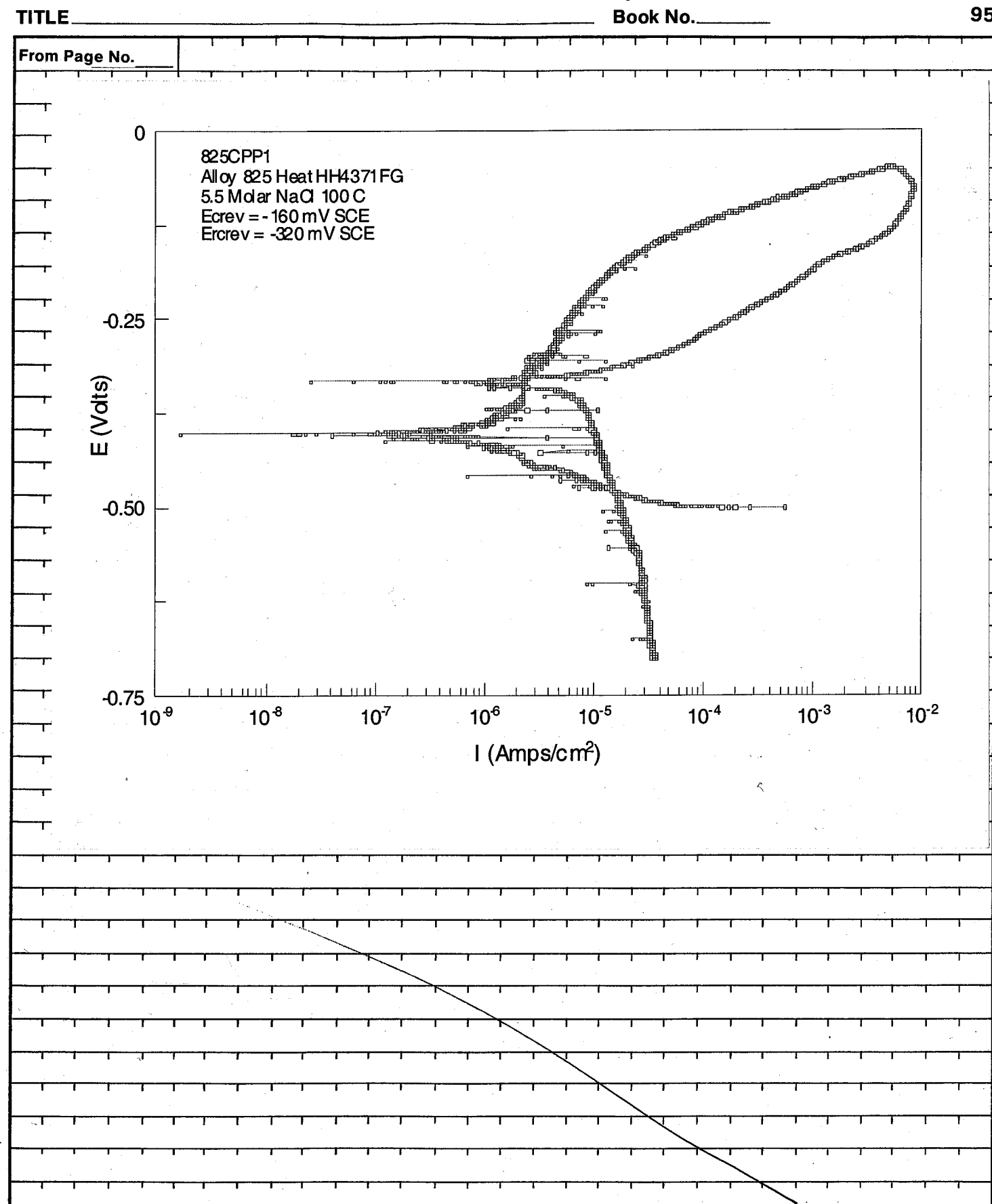
Number of Crevice Corrosion Sites: *8/24 (24 max.)*

MANY PITS ON OPEN SURFACES

DATA FILE *825CPP1.DAT*

To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>[Signature]</i>	<i>8/13/03</i>



To Page No. _____

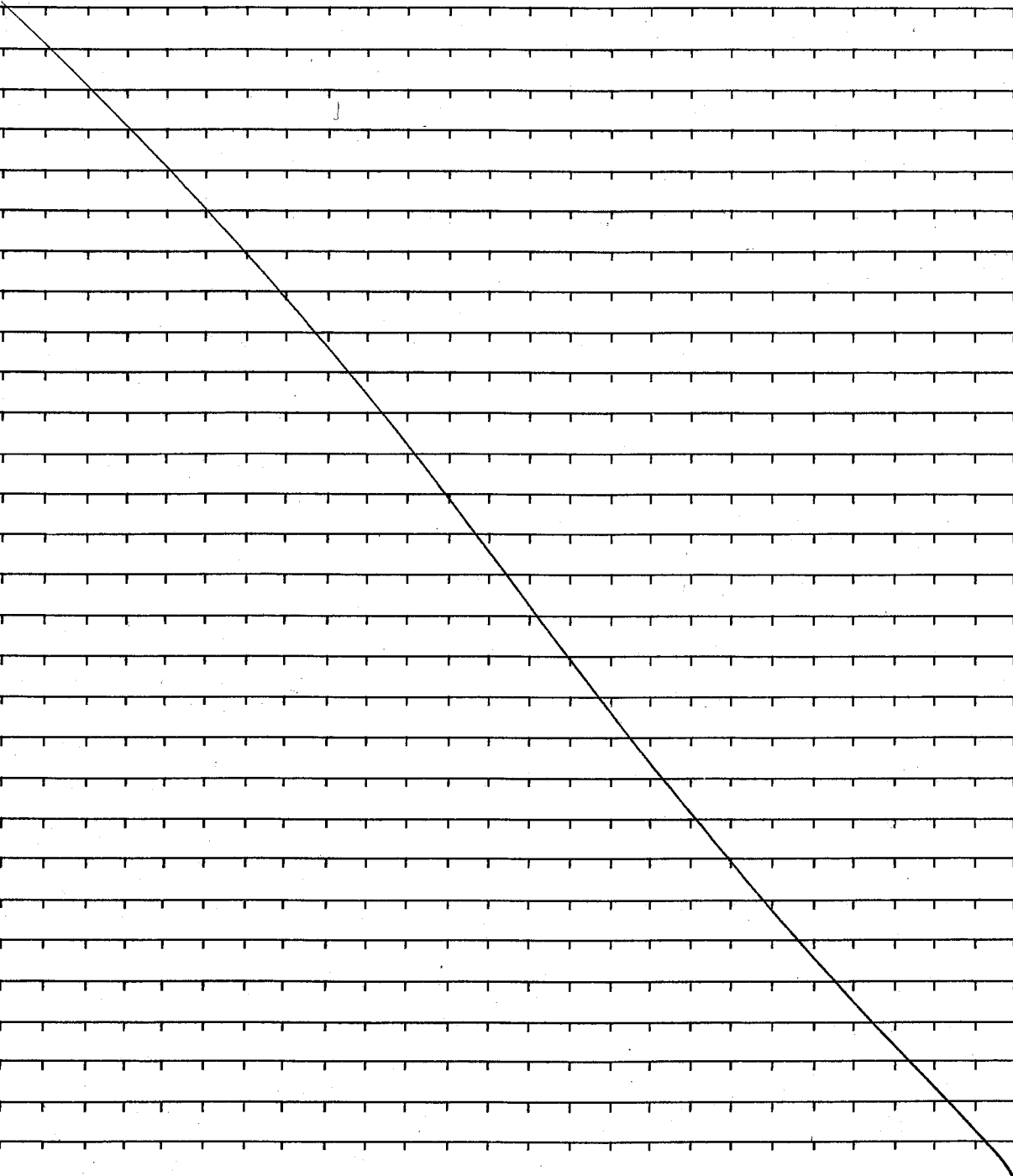
Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by <i>[Signature]</i>	<i>8/15/03</i>



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TESTS CONTINUED IN

NOTEBOOK 607



To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

[Signature]

8/15/03

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.

[Signature]

9/21/2004