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Q200304030004

Scientific Notebook # 540: DOE Alloy 22
Repassivation Tests (Continues in S/N # 578)

LABORATORY NOTEBOOK

CNWRA/SwRI

CNWRA
CONTROLLED
COPY 540

NOTEBOOK NO. 540
ISSUED TO DARRELL DUNN *Darrell Dunn DD*
ON AUGUST 7, 2002
DEPARTMENT 20
RETURNED 20

Brian K. Derby - *B. Derby* - BKD

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INSTRUCTIONS

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 - Use ink for permanence -- avoid pencil.
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 - Avoid making notes on loose paper to be recopied.
 - Record your work in such a manner that a co-worker can continue from where you stop. You might be ill and to protect your priority it could be urgent that the work continue while you are absent.
3.
 - Give a complete account of your experiments and the results, both positive and negative, including your observations.
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 - After entering your data, sign and date the entries.
 - Explain your work to at least two witnesses who are not co-inventors, and have them sign and date the pages in the place provided.
 - Record the names of operators and witnesses present during any demonstration and have at least two witnesses sign the page. If no witnesses are present during an experiment of importance, repeat it in the presence of two witnesses.
5. Since computer programs can be patented these instructions apply to the development of computer software. In this case a description of the structure and operation of the program should be recorded in the notebook, together with a basic flow diagram which illustrates the essential features of the program. In the course of developing the code, the number of lines of code written each day should be recorded in the notebook, together with a statement of the portion of the flow diagram to which the section of code is directed.
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TITLE _____

From Page No. _____

*Continues Testing from Notebook #505***Initial Scientific Notebook Entry for Department of Energy Alloy 22
Localized Corrosion Resistance Tests****Title:** DOE Alloy 22 Repassivation Tests.**Tests Performed by:** Darrell S. Dunn, Div 20; Brian Derby, Div. 18**Objectives:** Determine the effect of fabrication processes on the localized corrosion susceptibility of Alloy 22.**Equipment:** Laboratory oven for exposure of test specimens at 600 to 1125 °C, Thermocouple and thermocouple meter. Keithley 614/617. Solartron 1287 Potentiostat and CorrView Software or equivalent, Electrochemical test cell.**Materials:** Base alloy: Alloy N06022 Alleghany Ludlum heat 059902LL2 welded (GTAW) using Inco Alloys 622 heat XX2048BG filler. Other materials and heats to be added and identified prior to testing.**Specimen specifications:** Specimens will be equivalent to 20.01402.571.006 rev. 1 unless otherwise specified. Location of specimens with respect to weld will be identified.**Measurement Parameters:** Temperature and time of exposure, Potential and Current of specimen during test.**Required level of accuracy:** Temperature of thermal exposure ± 10 °C Temperature during corrosion tests ± 2 °C, Time of exposure ± 1 minute, Potentials ± 1 mV, 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.*Copies from Notebook #505*

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Witnessed & Understood by me, _____

Date _____

Invented by _____

Date/

Recorded by _____

8/8/02

From Page No. _____

Repassivation Potential of Alloy C-22

objective: Same As pg #1

specimen: DOE Alloy N06022 - Alleghany Ludlum heat 059902LL2
 Inco Alloy 622 heat XX2048 BG filler - specimen #1 Row #3 outside/Top
 Doesn't contain weld Material - 600 Grit Finish with 2 PTFE crevice washers
 Attached At 50 In-Oz Using Paula 6104 SN#139072 cal 2/14/02 due 8/14/02

start wt = 33.99610g SANTORIOUS Genius SN#12809099 cal 6/4/02 due 12/4/02
 End wt = 33.9878g

Solution 4.0 M NaCl
 467.55g NaCl Lot # 020514
 + DI water To 2000mls

pH Start = 6.831 Orion 720A Meter SN# 005885 cal 7/10/02 due 7/10/03
 pH End = 7.566 pH probe #13-620-296 SN#1100208

potentiostat: EG&G model #273 SN#41108

Counter Electrode: PT Flay

Reference: Fisher 12-610-52 SN# 8210502

Temperature: 80°C Hg Thermometer SN# H98-170 cal 5/10/02 due 5/10/03

Ecorr = -368mV Keithley 614 SN# 467374 cal 10/4/01 due 6/4/02
 Ept = +50mV

Solution Degassed with 99.999% N₂

Specimen Examination: crevice corrosion on 4/24 feet of crevice washer
 staining on All Surfaces of Specimen

Data DOE-w26

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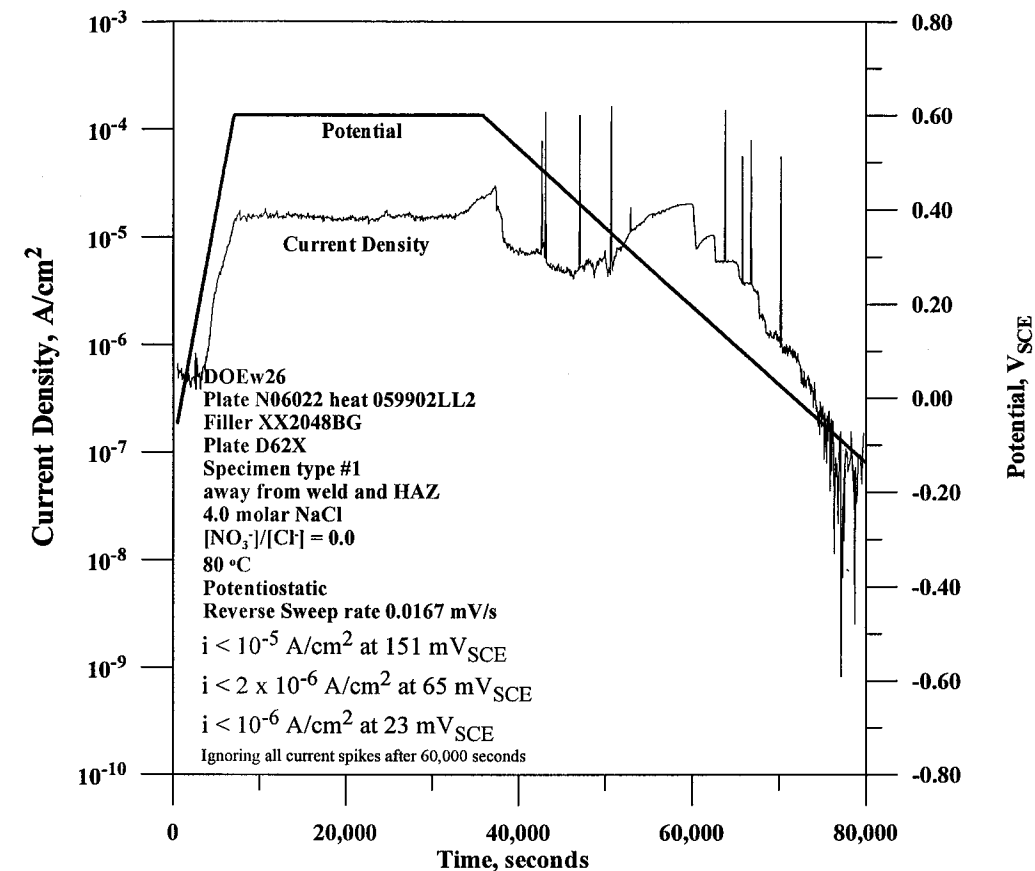
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Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048-BG filler - Specimen #1 Run #4 Center
 Presn! Contain Weld Material - 600 Grit Finish with 2 PTFE Groove Washers
 Attached At 50 In-O2 Using Photo 604 SN#139072 cal 2/4/02 due 5/4/02

Start wt: 33.93980g

Sartorius Genius SN#12909099 cal 6/4/02 due 12/4/02

End wt: 33.9344g

Solution: 1.0 M NaCl
 116.90g NaCl Lot #020814
 + DI water To 2000mls

pH start: 6.037

Orion 720A meter SN#005855 cal 7/10/02 due 7/14/03

pH End: 7.838

pH probe #13-620-296 SN#110020R

Potentiostat: EG & G model #273 SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#192121

Temperature: 60°C

H₂ Thermometer SN#60-387 cal 3/14/02 due 5/14/03

Ecorr: -383 mV

Keithley 614 SN#467374 cal 10/4/01 due 10/4/02

Ept: -59 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: No Groove Corrosion 1/4 feet of Groove Washer
 staining on All surfaces of Specimen

Data DOE-w27

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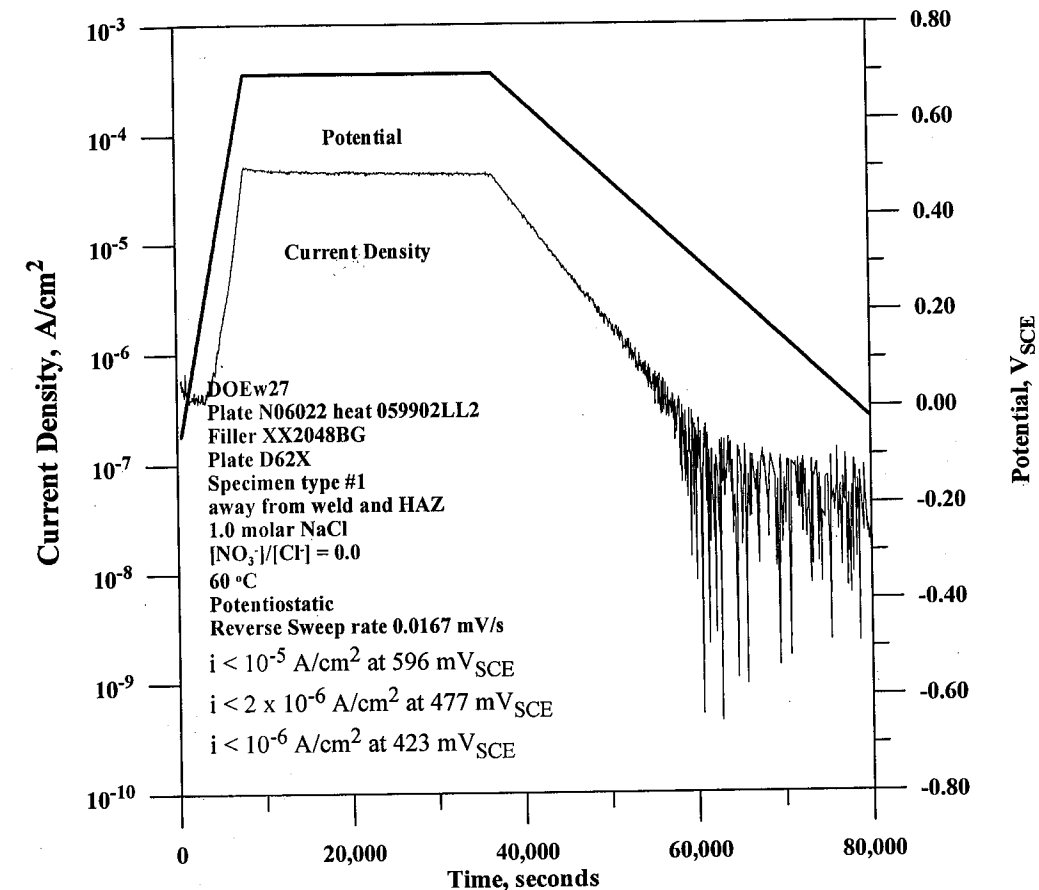
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Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum heat 059902LL2
 Inco Alloy 622 heat XX2048BG Filler - Specimen #2 Row #9 outside/Top
 Doesn't contain weld material - 600 grit Finish with 2 PTFE Crevice Washers
 Attached At 50 In-Oz Using Photo 6104 SN#135072 cal 2/14/02 due 8/14/02

Start wt: 34.1282g Sartorius Genius SN#12809099 cal 6/4/02 due 12/4/02
 End wt: 34.1262g

Solution: 4.0 M NaCl
 467.58g NaCl #020814
 DI To 2000ml

pH start: 6.520 Orion 720A Meter SN#005655 cal 7/14/02 due 7/16/03
 pH End: 6.006 pH probe #13-620-296 SN#1100204

Potentiostat: EG & G model #273 SN#41108

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#9210502

Temperature: 60°C Hg Thermometer SN#H98-170 cal 5/10/02 due 5/10/03

E_{corr} : -385 mV Keithley 614 SN#467374 cal 10/4/01 due 10/4/02
 E_{pt} : -80 mV

Solution Deaerates with 99.999% N_2

specimen Examination: Crevice Corrosion on 1/24 Set of Crevice Washers
 Mild staining on All Surfaces
 SOME INTERGRANULAR CORROSION IN CREVICED AREAS

Data DOE W28

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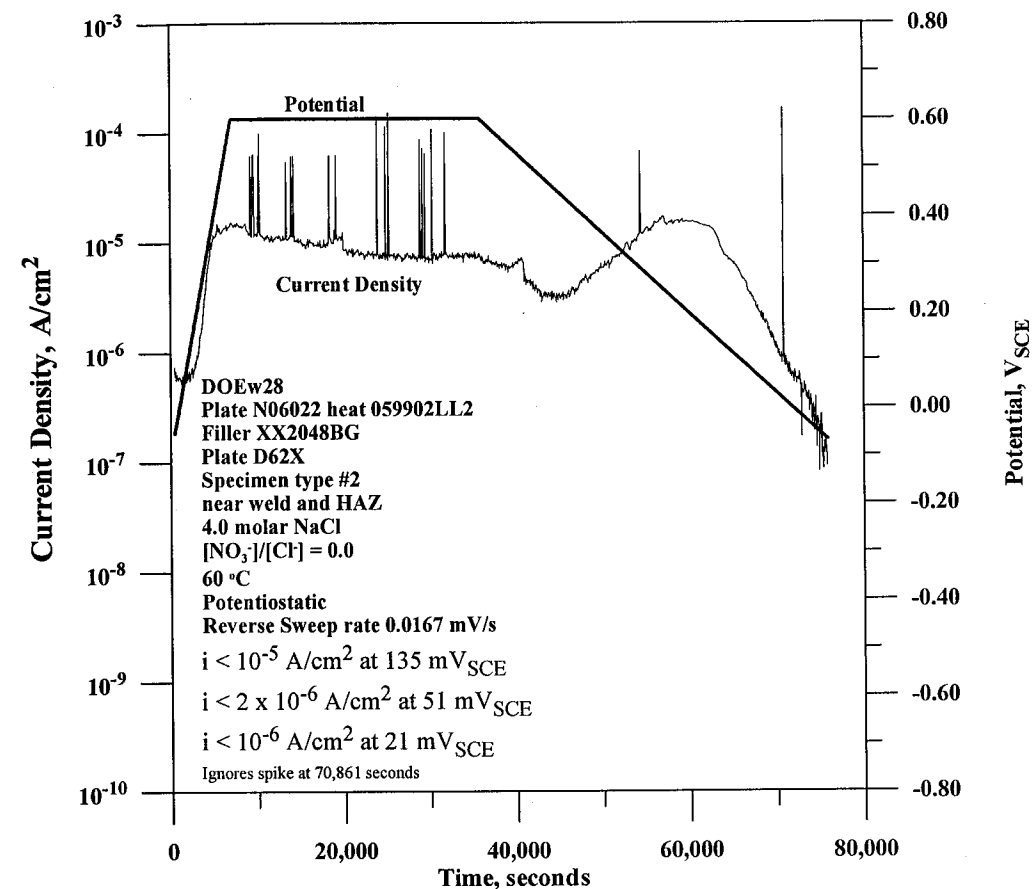
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8/14/02

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8/16/2002

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Repasivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 Heat XX2048BG Filler - Specimen #3 Row #2 outside/batter
 600 Grit finish with 2 PTFE Crevice Washers Attached At 50 In-O₂
 Using Pasta 6104 sn# 139072 cal 2/14/01 due 8/14/02 - Contains Weld Material

Start wt: 33.84147g Santaricus Genius sn# 2509099 cal 4/4/01 due 12/4/02
 End wt: 33.83680g

Solution: 1.0 M NaCl
 116.89g NaCl Lot #020814
 + DI water To 2000ml

pH Start: 6.016 Orion 720A Meter sn# 005885 cal 7/14/02 due 7/14/03
 pH End: 6.632 pH probe #15-620-296 sn# 1100205

Potentiostat: EG&G model #273 sn# 10120

Counter Electrode: PT Flg

Reference: Fisher 13-620-52 sn# 192121

Temperature: 60°C Hg Thermometer sn# 00-387 cal 5/10/02 due 5/10/03

E_{corr} = -370 mV Keithley 614 sn# 467374 cal 10/4/01 due 10/4/02
 E_{pt} = +55 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: No Crevice Corrosion 0/24 feet
 staining on All surfaces of Specimen
 * Repolished Specimen for Further Testing

Data DOE W29

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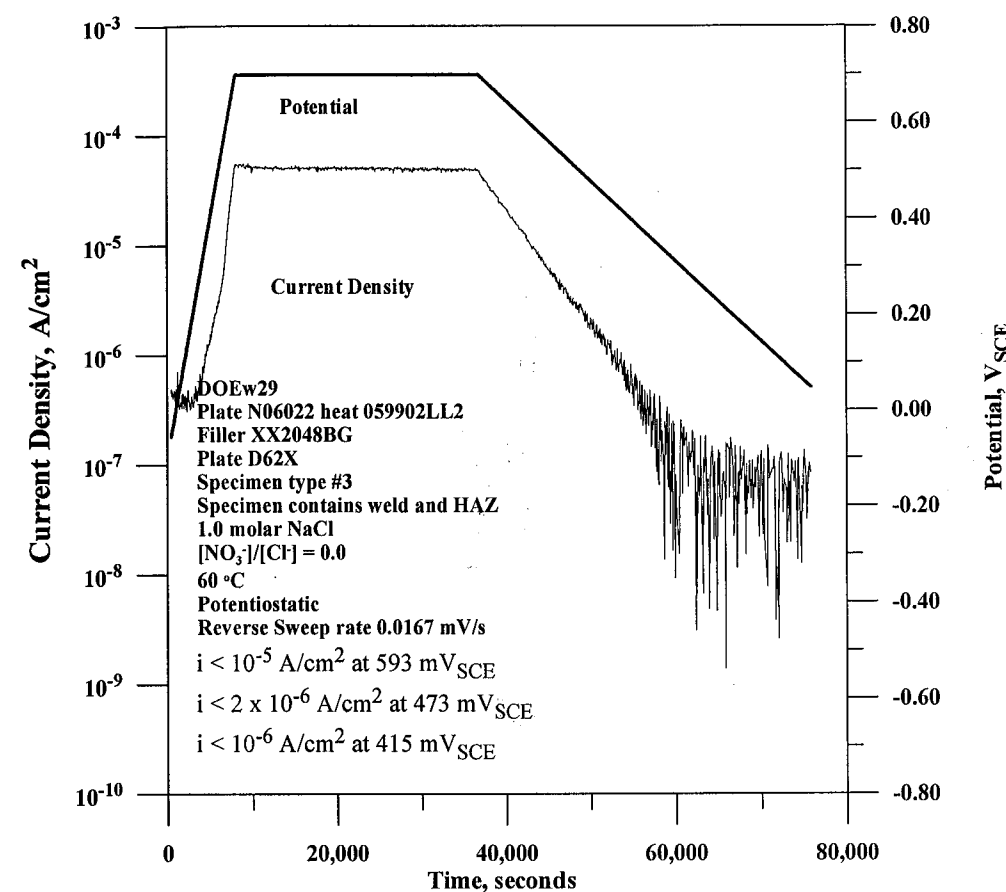
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8/16/2002

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Repassivation Potential of Alloy C-22

objective: Same As pg #1

specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 Heat XX2048BG filler - Specimen #2 Row #1 outside/south
 Does not contain weld Material - 600 grit Finish with 2 PTFE crevice washers
 Attached At 50 In - Oe Using Pauto 6104 SN#139072 cal 2/14/02 due 5/14/02

Start wt: 34.17047g Santorians Corvus SN#12809099 cal 6/4/02 due 12/4/02
 End wt: 34.16883g

Solution: 1.0 M NaCl
 116.88g NaCl lot #020814
 + DI water to 2000 ml

pH Start: 5.895 Orion 720A Meter SN#005885 cal 7/10/02 due 7/10/05
 pH End: 7.529 pH probe #13-620-296 SN#1160208

Potentiostat: EG&G model #273 SN#41108

Counter Electrode: Pt Hg

Reference: Fisher 13-620-52 SN#8210502

Temperature: 60°C Hg Thermometer SN#H98-170 cal 5/14/02 due 5/14/05

E_{corr} = -443 mV Keithley 614 SN#467374 cal 1/4/01 due 10/4/02
 E_{pt} = +136 mV

Solution Deaerates with 99.999% N₂

Specimen Examination: Crevice Corrosion on 1/24 feet of crevice washer
 staining on All surfaces of specimen

DOE w 30

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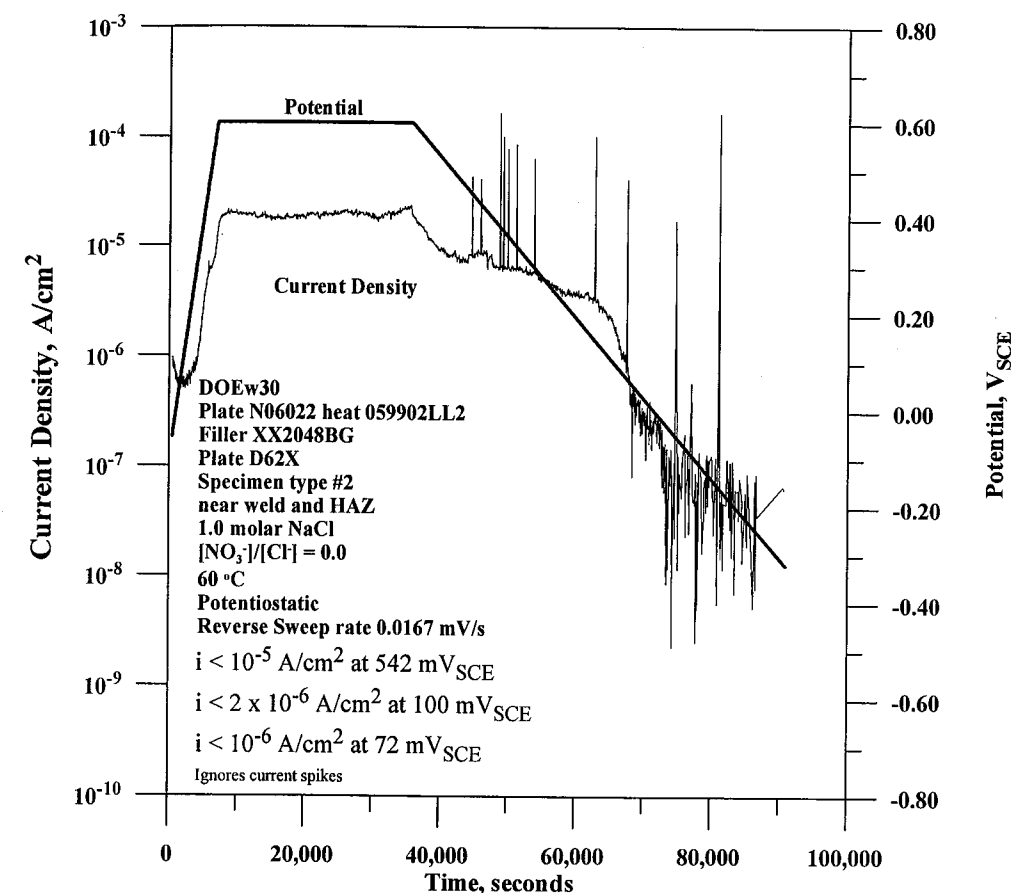
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B. J. [Signature]

8/16/02

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D. J. [Signature]

8/17/2002

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Repasivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG - Filler Specimen #3 Row #2 cut in/50th
 Contains weld Material - 600 Grt Finish - with 2 PTFE
 Crevice Washer Attached At 50 In-De Using Photo 6/04 SN#139072 cal 2/14/02 due 3/14/02

Start ut: 33.77303, Santaricus Genius SN#0809099 cal 6/14/02 due 12/4/02
 End ut: 33.77198

Solution: 2.0 M NaCl
 233.76 g NaCl lot# 010514
 + DI water To 2000mls

pH Start: 6.287, Orion 720A Meter SN#005885 cal 8/10/02 due 7/10/03
 pH End: 7.059, pH probe #13-620-296 SN#1100208

Potentiostat: EG & G model #273 SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#192121

Temperature: 60°C, Hg Thermometer SN#00-387 cal 5/10/02 due 5/10/02

E_{com}: -374mV, Keithley 614 SN#467374 cal 10/4/02 due 10/4/02
 E_{pt}: +87mV

Solution Deaerates with 99.999% N₂

Specimen Examination: No Crevice Corrosion 0/24 feet
 Staining on All Surfaces of Specimen

Data DOE W31

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Date

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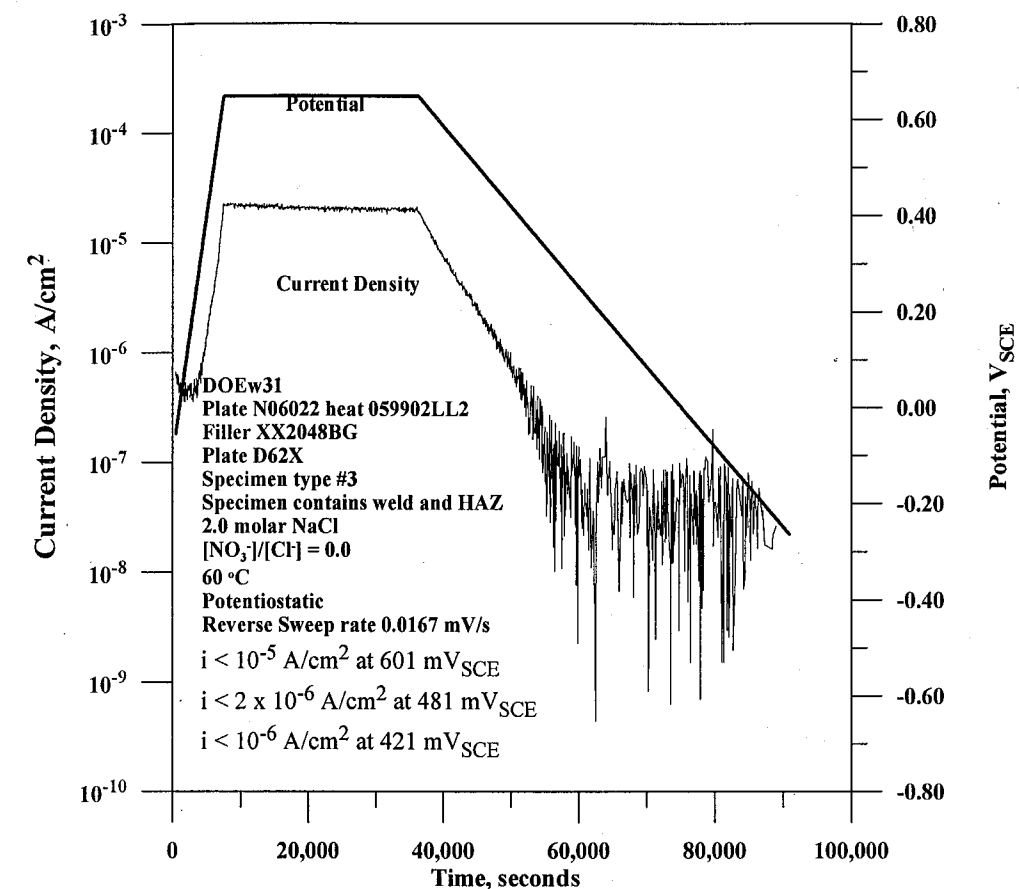
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D. K. [Signature]

8/17/2002

From Page No. _____ Repassivation Potential of Alloy C-22

objective: Same As #1

specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
Taco Alloy 622 heat XX2048BG Filler - Specimen #2 Row #1 Center
Doesn't contain weld material - 600 grit Finish with 2 PTFE crevice washers
Attached At 30 In-Oz Using Photo 6103 SN#2 cal 7/5/02 due 1/5/03

start wt: 34.1048g Santaricus Genius SN#12809099 cal 4/4/02 due 12/4/02
End wt: 34.1028g

Solution 0.25 M NaCl
29.220g NaCl
+ DI To 2000mls

pH start: 5.487 Orion 720A Meter SN#005585 cal 7/10/02 due 7/10/03
pH End: 6.895 pH probe #13-020-296 SN#1100205

potentiostat: EG & G model #273 SN#41108

Counter Electrode: Pt Flag

Reference: Fisher 13-620-32 SN#8210502

Temperature: 60°C Hg Thermometer SN#H98-170 SA 5/10/02 due 5/10/03

E_{corr} = -420mv Keithley 614 SN#467374 cal 6/4/01 due 6/4/02
E_{pt} = +173mv

Solution Deaerated with 99.999% N₂

specimen Examination: Crevice Corrosion on 1/24 feet of crevice washer
staying on All surfaces of specimen

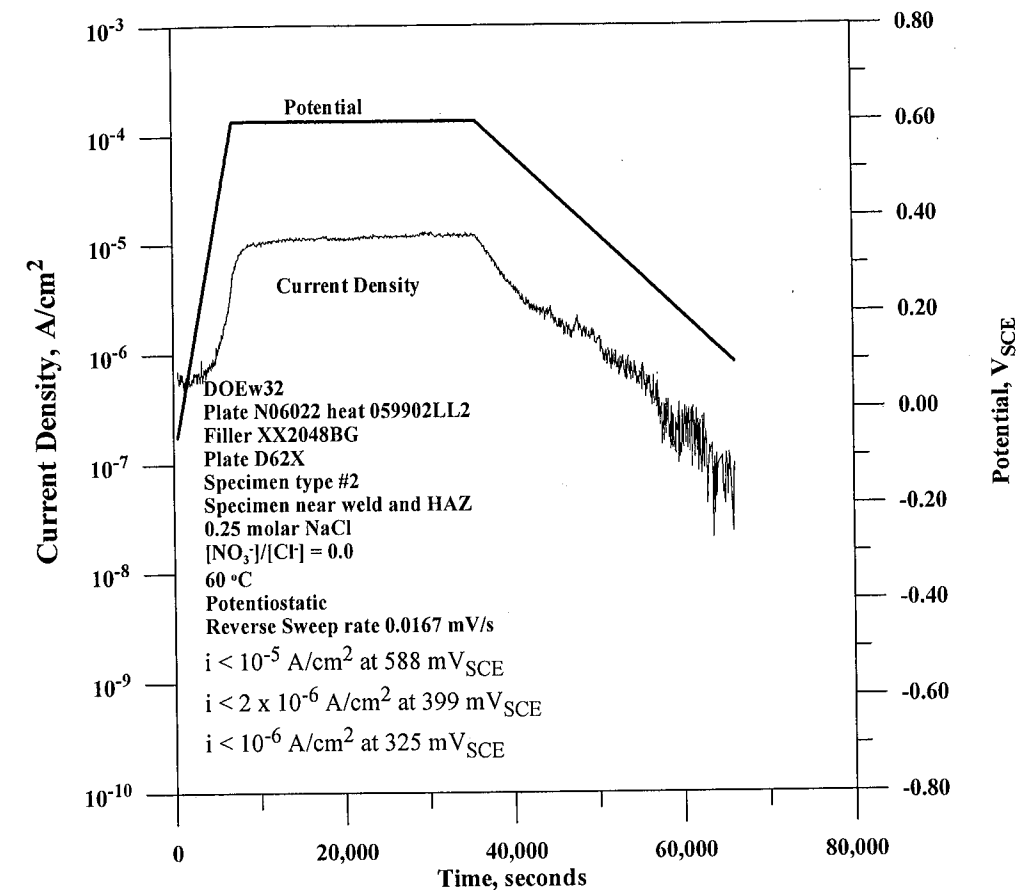
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Witnessed & Understood by me, _____ Date _____
Invented by _____ Date 8/20/2002
Recorded by _____

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Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 Heat XX2048BG filler - Specimen #2 Row #2 outside / Top
 Detail Contain Weld Material - 600 Grit Finish with 2 PTFE Crevice Washer
 Attached At 50 In-Oz Using Padlo 6103 SN#2 cal 7/5/02 due 1/5/05

Start wt: 34.09896g Santarious Genius SN#12709099 cal 6/4/02 due 12/4/02
 End wt: 34.09812g

Solution 0.50 M NaCl
 58.47g NaCl lot #020814
 + DI water To 2000mls

pH start = 5.693 Orion 720A meter SN#005885 cal 7/10/02 due 7/10/03
 pH End = 7.217 pH probe #13-620-296 SN#1160205

Potentiostat: EG&G model #273 SN#10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN#192121

Temperature: 60°C H₂ thermometer SN#00-387 cal 5/10/02 due 5/10/03

E_{corr} = -429 mV Keithley 614 SN#467374 cal 10/4/01 due 10/4/02
 E_{pt} = +118 mV

Solution Deaerates with 99.999% N₂

Specimen Examination: Crevice Corrosion on 3/24 feet of Crevice Washer
 Staining on All Surfaces of Specimen

Data DOE-w33

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Witnessed & Understood by me, _____

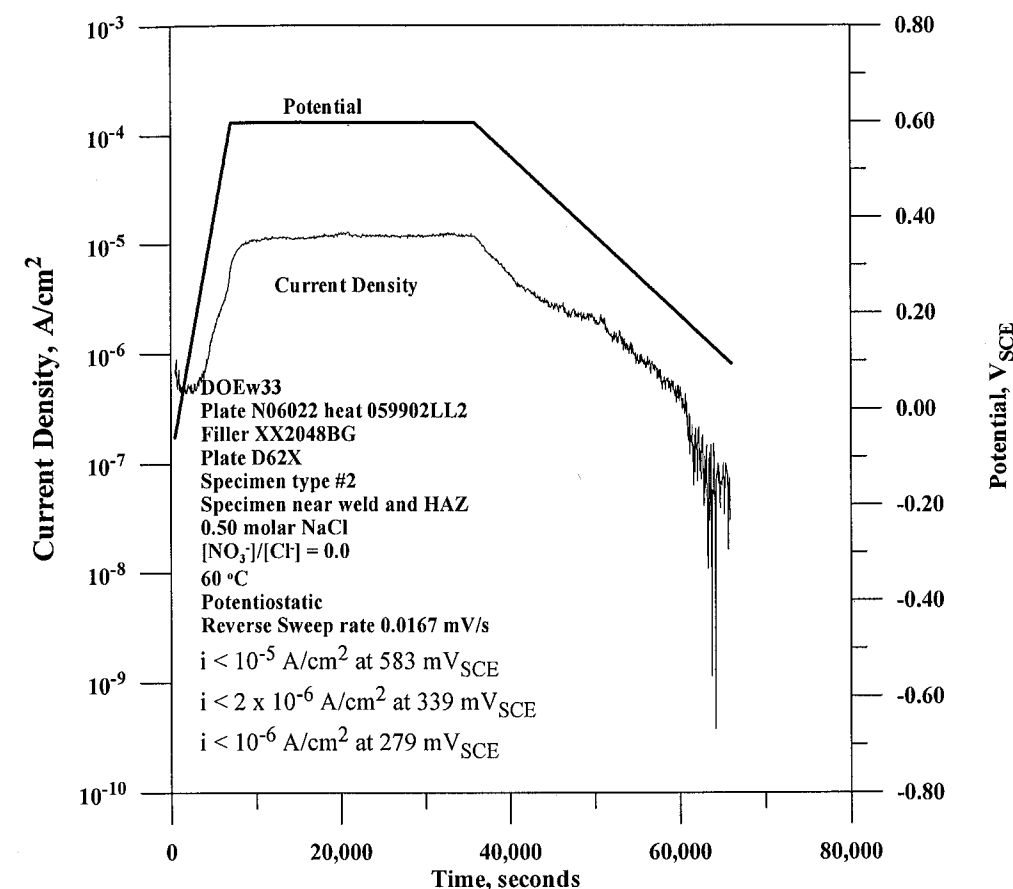
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Date 8/19/02

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Witnessed & Understood by me, _____

Date _____

Invented by _____

Date 8/20/2002

Recorded by _____

From Page No. _____

THERMAL TREATMENT OF SPECIMENS

SPECIMENS TYPE 2 NEAR WELD AND NAZ

OVEN LINDBERG MODEL 51333 SN 909172

SET POINT 870°C

TEMP CHECK OMEGA NH 22 SN T94140 CAL MAR 22, 02
DUE SEPT 22, 2002

THERMOCOUPLE 326 CAL 7/15/2002 DUE 1/15/2003

Thermally Age Type #2 Specimens Row #4 Row #3 (All 3 Specimens)
And then Center And Bottom from Row #2 Total = 8 Specimens
for 5 min @ 870°C

Lindberg Oven Set point 870°C

Lindberg Oven Readings	Specimens #4	Specimens #3	Specimen #2
1:00 min =	869°C	870°C	869°C
2:00 min =	869°C	871°C	870°C
3:00 min =	870°C	870°C	870°C
4:00 min =	870°C	869°C	870°C
Removed =	870°C	869°C	870°C

Omega Microprocessor Thermometer
Readings with thermocouple #326

Specimen #4	Specimen #3	Specimen #2
900°C - 921°C	902°C - 916°C	902°C - 926°C

All 8 specimens were polished to A 600 Grit Finish
Before thermally ageing procedure

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TITLE _____

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Specimens: Type #2 Row #2 Bottom specimen And Top Specimen
Type #2 Row #3 Top Specimen And Center

All Specimens Solution Annealed

Used Lindberg oven model # 51333 SN # 909172

Set point Temperature 1120°C

Temperature checked with Omega NH 22 SN # T94140
Cal 3/22/02 Due 9/22/02

Thermocouple SN # 332 Cal 7/15/02 Due 1/15/03

oven set point 1120°C

Thermocouple Reading = 1145°C

Total Time 12 min @ Set Point Temp

2 minutes To ^{soak} Achieve Temperature
10 minutes At Set point Temperature

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Witnessed & Understood by me, _____ Date _____
Invented by _____ Date 8/29/02
Recorded by *B. K. O.*

From Page No. _____ Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
Inco Alloy 622 heat XX2048BG filler. Specimen #2 Row #2 center
Doesn't contain weld material - thermally aged 5 min @ 870°C then annealed
(See pg # 18-19) 600 Grit Finish with 12 PTFE crevice washers attached
At 50 Zn-02 Using Photo 6103 ^{5/10/02} SN# 15 6105 SN# 2 cal 7/5/02 due 1/5/03

Start wt: 33.82515g Sartorius Genius SN# 12809099 cal 6/4/02 due 12/4/02
End wt: 33.82355g

Solution: 0.25 M NaCl
29.273g NaCl Lot # 025749
+ DI water To 2000mls

pH Start: 5.898 Orion 720A Meter SN# 005885 cal 7/8/02 due 7/10/03
pH End: 6.241 pH probe # 13-620-296 SN# 1100208

Potentiostat: EG & G model # 273 SN# 41108

Counter Electrode: PT Flay

Reference: Fisher 13-620-52 SN# 6210502

Temperature: 60°C Hg Thermometer SN# H58-170 cal 5/10/02 due 5/10/03

Ecom -416 mV Keithley 614 SN# 467374 cal 10/4/01 due 10/4/02
Ept +2841 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: No crevice corrosion on 24 feet of crevice washer
staining MILs on All Surfaces

DOEW34

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Witnessed & Understood by me,

Date

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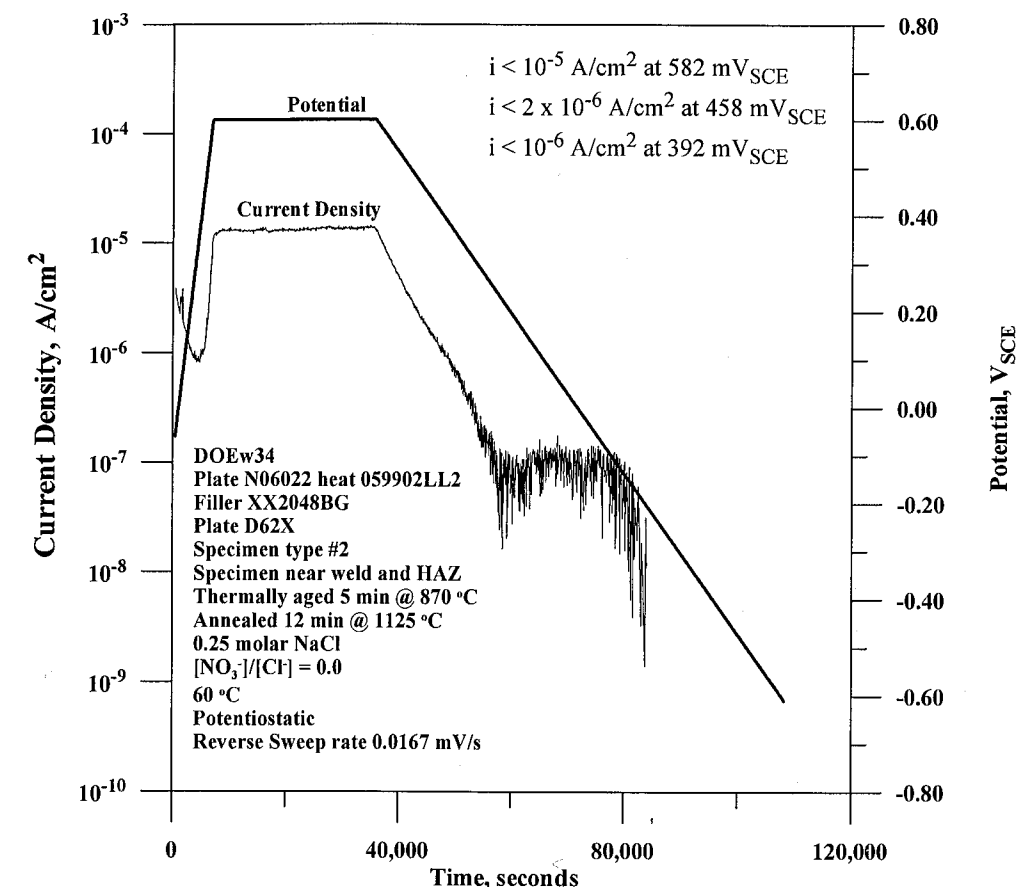
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9/11/2002

To Page No. _____

From Page No. _____ Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
Inco Alloy 622 Heat XX2048BG Filler - Specimen #2 Row #2 Outside/Bottom
Doesn't contain weld Material - 600 Grit Finish with 2 PTFE gaskets
Washers Attached At 50 In.-Oz Using Pencil 6103 SW# cal 7/10/02 due 1/10/03
Specimen Thermally Aged 5 min @ 870°C then Annealed (See pg #18-19)

Start wt: 33.90814g Sartorius Genius SN# 12809099 cal 6/4/02 due 12/4/02
End wt: 33.90665g

Solution: 0.50 M NaCl
58.48g NaCl Lot # 025149
+ DI water To 2000 ml

pH start = 6.013 Orion 720A meter SN# 005885 cal 7/10/02 due 7/10/03
pH End = 6.049 pH probe # 15-620-296 SN# 1100208

Potentiostat: EG & G model #273 SN# 10120

Counter Electrode: Pt Flag

Reference: Fisher 15-620-52 SN# 192121

Temperature: 60°C Hg thermometer SN# 00-387 cal 5/10/02 due 5/10/03

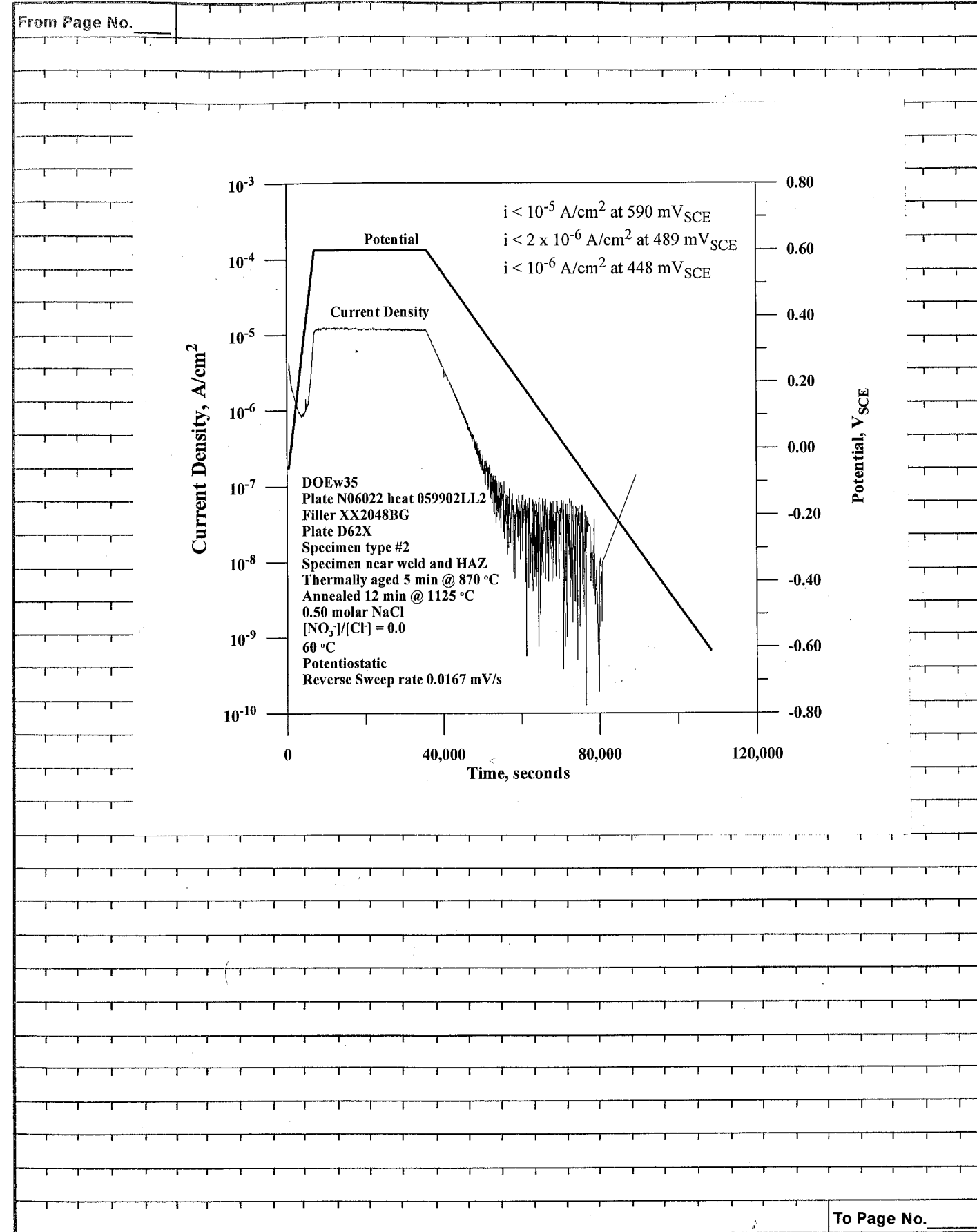
Ecorr: -393 mV Keithley 614 SN# 467374 cal 10/4/01 due 10/4/02
Ept: +345 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: No crevice corrosion 1/24 feet of crevice washer
staining mls on All Surfaces of Specimen

DOE-W35

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	8/30/02



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	9/11/2002

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG filler: Specimen #2 Row #3 Center
 Does not contain weld material - Thermally Aged 5 min @ 870°C then Annealed
 See pg #18-19 600 Grit Finish with 2 PTFE Crevice Washers Attached
 At 50 In-O2 Using Photo 6103 SN#2 cal 7/15/02 due 7/15/03

Start wt: 33.80423g Sartorius Genie SN#12809099 cal 6/4/02 due 12/4/02
 End wt: 33.79789g

Solution: 1.0 M NaCl
 116.90g NaCl lot #025149
 + DI water To 2000ml

pH start: 7.382 Orion 720A meter SN#005885 cal 7/10/02 due 7/10/03
 pH End: 7.589 pH probe #13-620-296 SN#1100208

Potentiostat: EG & G model #273 SN#41108

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#8210502

Temperature: 60°C Hg Thermometer SN#H58-170 cal 5/10/02 due 5/10/03

Ecorr: -369mV Keithley 614 SN#467374 cal 10/4/01 due 10/4/02
 Ept: +238mV

Solution Deaerates with 99.999% N₂

Specimen Examination: Crevice Corrosion on 1/24 feet of crevice washer
 staining on All Surfaces of Specimen

Data DOE-w-36

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Witnessed & Understood by me,

Date

Invented by

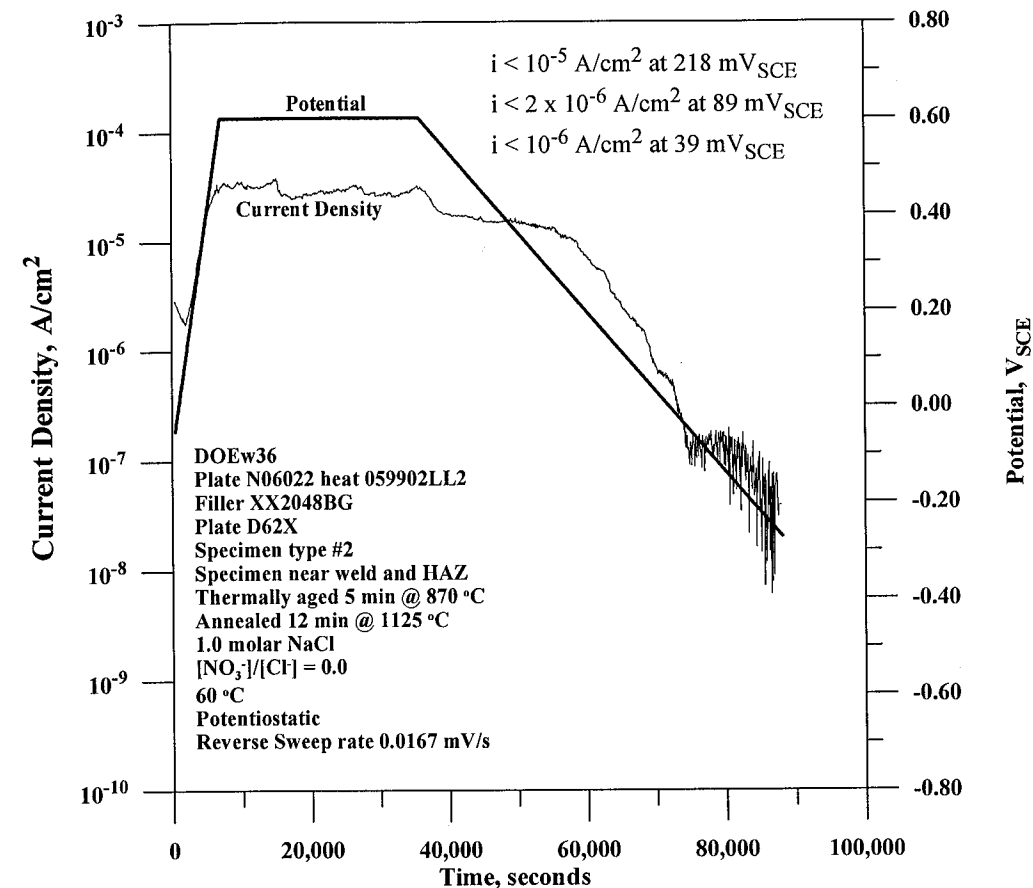
Date

Recorded by

B. J. [Signature]

9/3/02

From Page No. _____



Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

B. J. [Signature]

11/7/2002

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Taco Alloy 622 heat XX2048BG Filler - Specimen #2 Row #3 Outside/Top
 Doesn't contain weld Material - Thermally Aged 5 min @ 870 °C then Annealed
 (See pg #18-19) 600 Grit Finish - with 2 PTFE Crevice Washers Attached
 At 30 In-Oz Using Probe 6103 SN#2 cal 7/5/02 due 7/15/03

Start wt = 33.90507g Santorionic Grease SN#12809099 cal 6/4/02 due 12/4/02
 End wt = 33.89934g

Solution: 4.0 M NaCl
 467.58g NaCl Lot #025149
 + DI water To 2000mls

pH start: 7.617 Orion 720A meter SN#005885 cal 7/10/02 Due 7/16/03
 pH End: 7.830 pH probe #13-620-296 SN#160205

Potentiostat: EG & G model #273 SN#10120

Counter Electrode: Pt Flay

Reference: Fisher 13-620-52 SN#A2121

Temperature: 60 °C Hg Thermometer SN#00-357 cal 5/10/02 Due 5/10/03

E_{corr} = -283 mV Keithley 614 SN#467374 cal 10/4/01 Due 10/4/02
 E_{pt} = +276 mV

Solution Deaerated with 99.999% N_2

Specimen Examination: Crevice Corrosion on 22/24 feet of Crevice Washer
 Stripping on All Surfaces of Specimen

Data DOE-W37

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

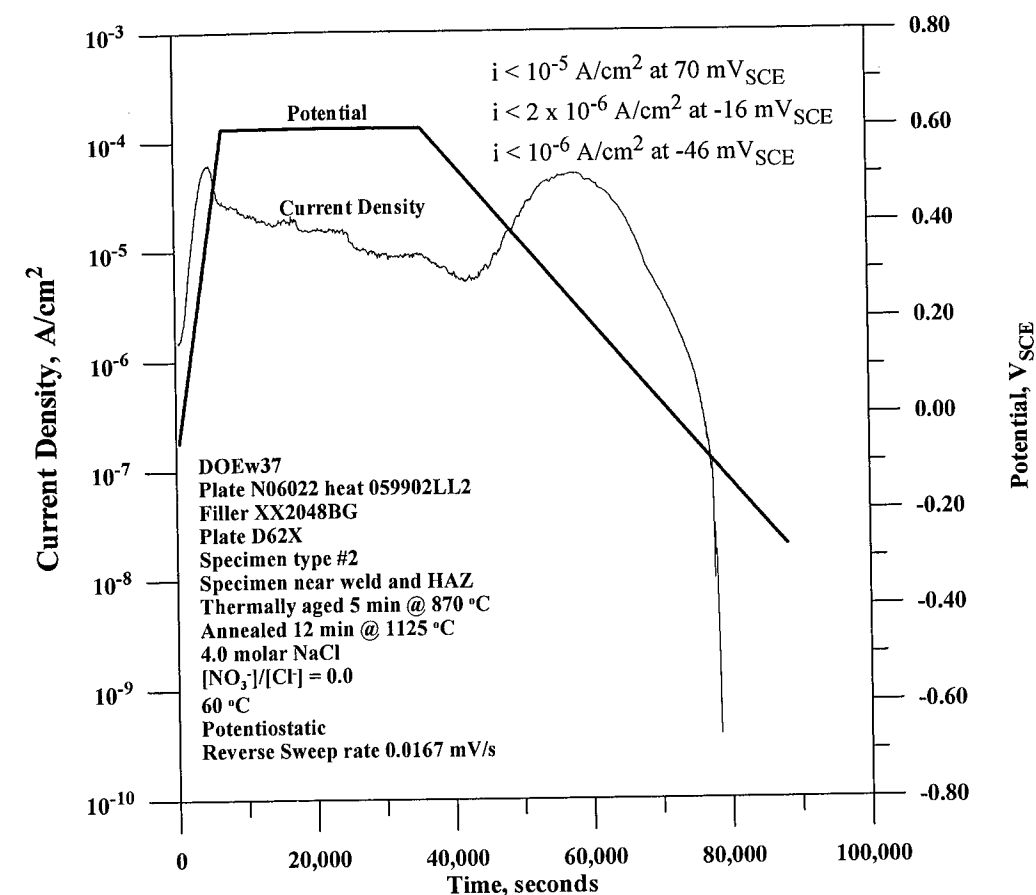
Date _____

Recorded by _____

9/5/02

TITLE _____

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/7/2002

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG filler - Specimen #2 Row #3 outside/sottom
 doesn't contain weld Material - 600 Grit Finish - Thermally Aged
 870°C for 5 min (See pg #18) with 2 PTFE Crevice Washers
 Attached At SO In-02 Using Photo 6108 SN#2 cal 7/5/02 due 1/5/03

Start wt = 33.81272g Sartorius Genius SN#12809099 cal 6/4/02 due 12/4/02
 End wt = 33.81100g

Solution: 0.25 M NaCl
 29.224g NaCl Lot# 02849
 + DI water To 2000mls

pH Start = 6.734 Fisher Accumet 950 meter SN#3340 cal 8/7/02 due 8/7/03
 pH End = 8.104 pH probe #13-620-296 SN#1100208

Potential: EG + G model #273 SN#41108

Counter Electrode: PT Flay

Reference: Fisher 13-620-52 SN#8210502

Temperature: 60°C Hg Thermometer SN#498-170 cal 5/10/02 due 5/10/03

Ecorr = -380 mV Keithley 614 SN#467374 cal 10/4/01 due 10/4/02
 Ept = +271 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 3/4 feet of Crevice Washer
 Staining on All Surfaces

Data DOE-W38

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

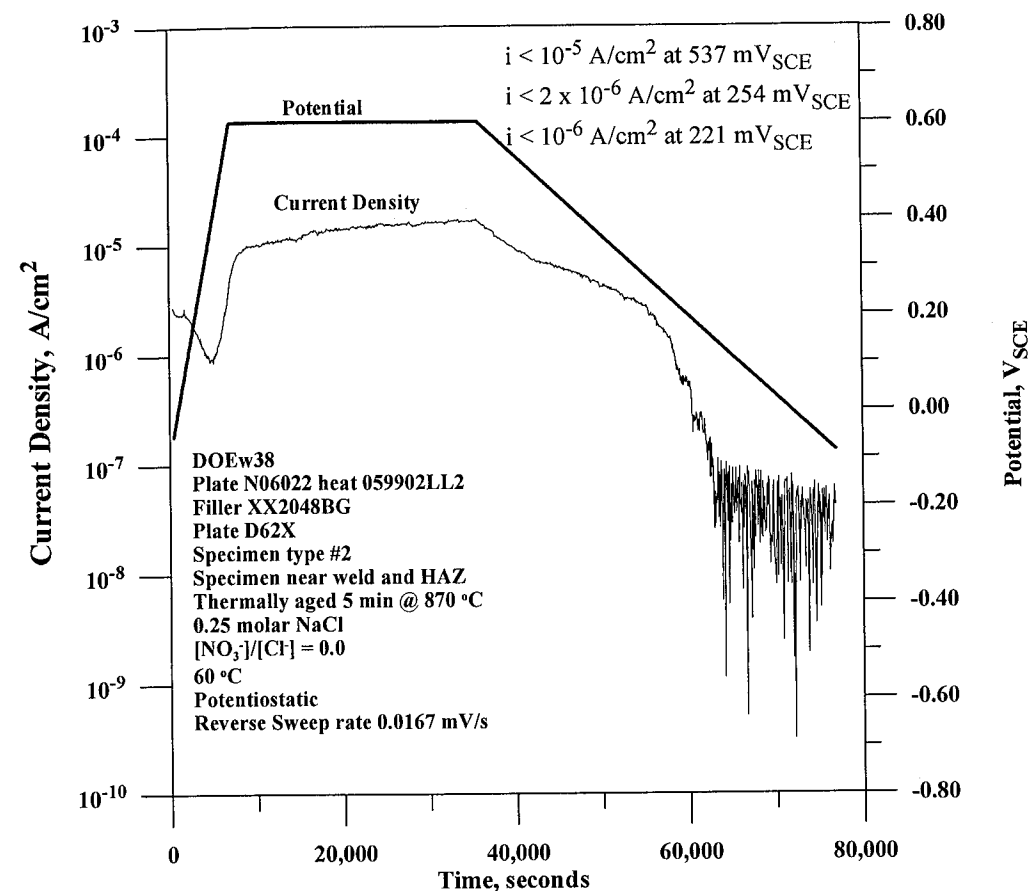
Date _____

Recorded by _____

B. V. Dax

2/5/02

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

B. V. Dax

11/12/2002

From Page No. _____

Repasivation Potential of Alloy C-22

Objective: Same As #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG filler - Specimen #2 Row #4 outside/Top
 Down! Contain Weld Material - 600 Grit Finish - Thermally Aged
 870 °C for 5 min (See pg #18) with 2 PTFE Crevice Washers
 Attached At SO In-02 Using Photo 6109 SN#2 cal 7/6/02 due 1/5/03

Start wt = 33.99019g Santaricus Genius SN#12809099 cal 6/4/02 due 12/4/02
 End wt = 33.98858g

Solution: 0.50 M NaCl
 58.48g NaCl Lot # 025149
 + DI water To 2000mls

pH Start = 6.512 Fisher Accumet 950 meter SN#3340 cal 8/7/02 due 8/7/03
 pH End = 7.166 pH probe #13-620-296 SN#1100208

Potentiostat: EG & G model #273 SN#10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN#192121

Temperature: 60 °C Hg Thermometer SN#00-387 cal 5/10/02 due 5/10/03

Ecorr = -430 mV Keithley 614 SN#467374 cal 1/4/01 due 1/4/02
 Ept = +221 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 5/24 feet of Crevice Washer
 Staining on All Surfaces of Specimen

Data DOE-W39

To Page No. _____

Witnessed & Understood by me, _____

Date _____

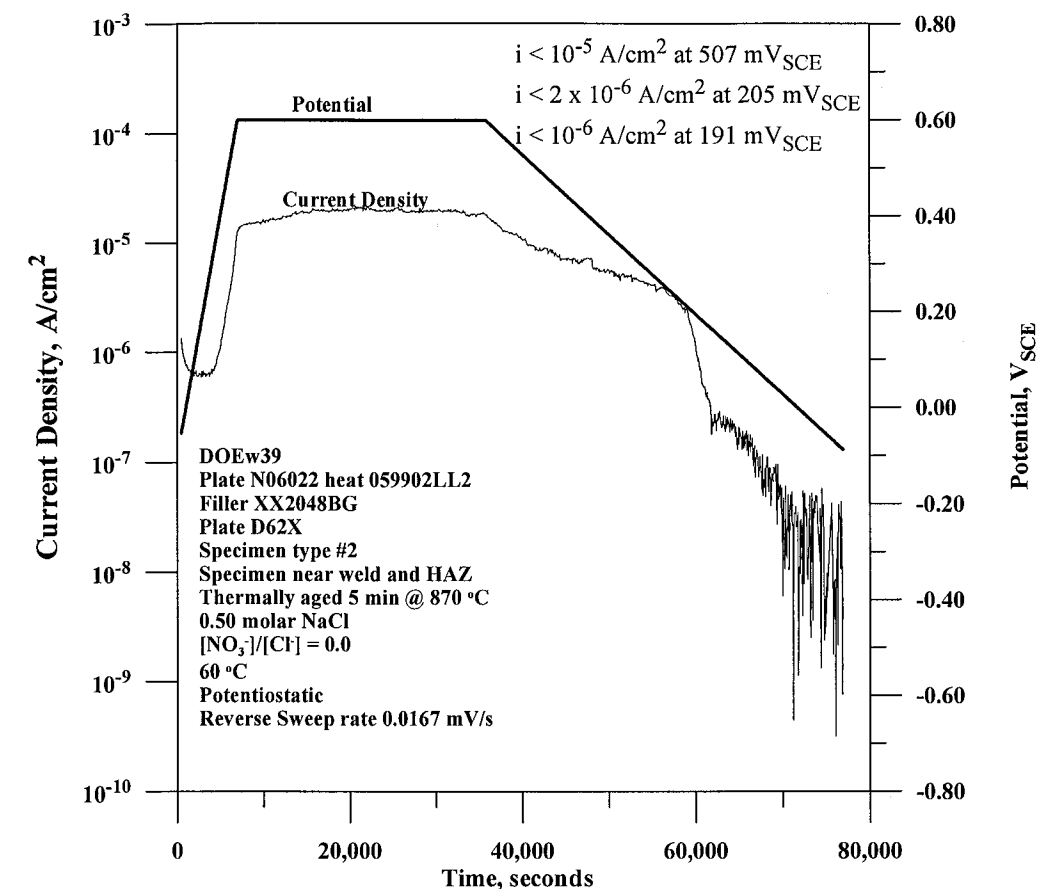
Invented by _____

Date _____

Recorded by _____

9/5/02

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/7/2002

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Alleghany Ludlum Heat 059902LL2
 Inconel Alloy 622 heat XX2048BG filler - Specimen #2 Row #4 outside/bottom
 Doesn't contain weld material - 600 grit Finish. Thermally Aged At
 870°C for 5 min (see pg #18) with 2 PTFE Ceramic Washers
 Attached At 50 In-oz. Using Photo 6103 SN#2 cal 7/5/02 due 1/5/03

Start wt: 33.9437g Santaricus Genius SN#12809099 cal 6/4/02 due 12/4/02
 End wt: 33.9406g

Solution: 1.0 M NaCl
 116.89g NaCl lot 025145
 + DI water To 2000ml

pH Start = 6.724 Fisher Accumet 950 meter SN#3340 cal 8/7/02 due 8/7/05
 pH End = 6.872 pH probe #13-620-296 SN#1100208

Potentiostat: EG & G model #273 SN#41108

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#8210502

Temperature: 60°C Hg Thermometer SN#498-170 cal 5/10/02 due 5/10/05

Ecorr = -471 mV Keithley 614 SN#467374 cal 10/4/01 due 10/4/02
 Ept +160 mV

Solution Deaerates with 99.999% N₂

Specimen Examination: Ceramic Corrosion on 7/24 feet of Ceramic Washers
 staining on All Surfaces of Specimen

Data DOE-W40

To Page No. _____

Witnessed & Understood by me, _____

Date _____

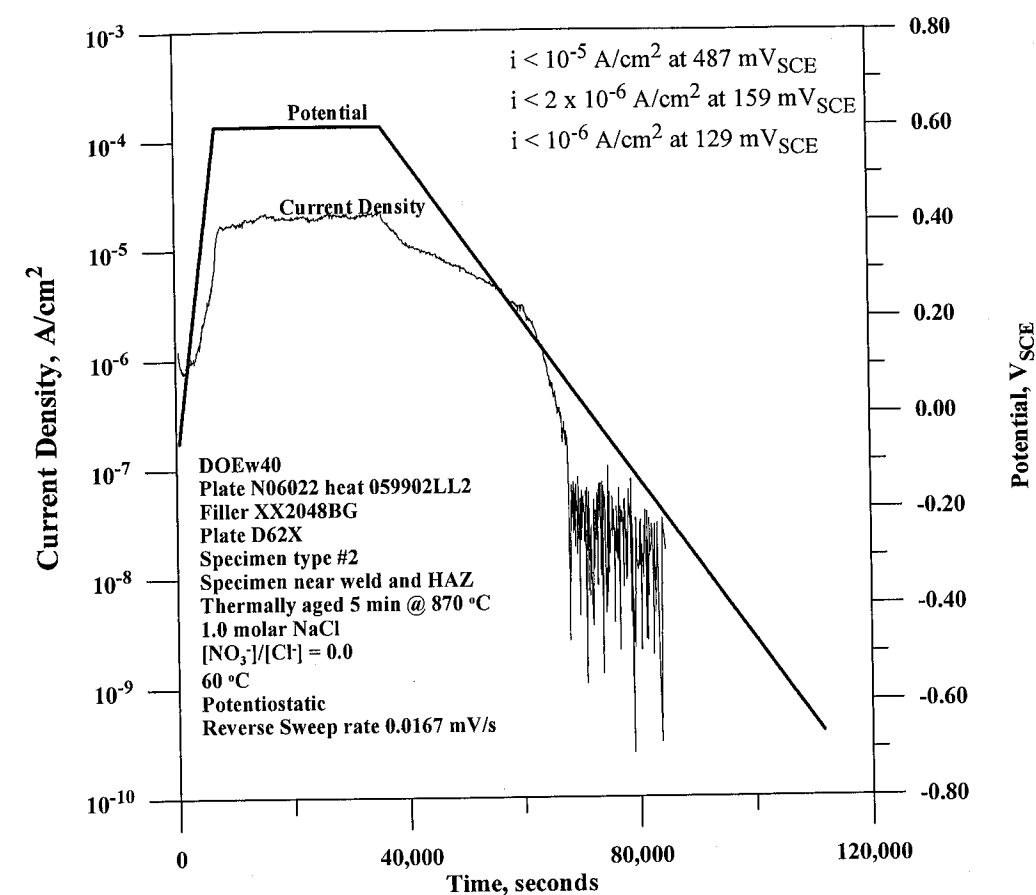
Invented by _____

Date _____

Recorded by _____

9/10/02

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/7/2002

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Incon Alloy 622 heat XX2048BG filler - Specimen #2 Row #4 Center
 Doesn't contain weld Material - 600 Grit Finish - Thermally Aged At
 870°C for 5 min (See pg #18) with 2 PTFE crevice washers Attached
 At 50 In-O₂ Using Photo 6103 SN#2 cal 7/5/02 due 1/5/03

Start wt: 33.9488g Santaricus Genius SN#1280909 cal 6/4/02 due 12/4/02
 End wt: 33.94846g

Solution: 4.0 M NaCl
 467.58g NaCl Lot #025149
 + DI water to 2000 ml

pH Start: 6.112 Fisher Accumet 950 meter SN#3340 cal 8/7/02 due 8/7/05
 pH End: 7.379 pH probe #13-620-296 SN#1100208

Potentiostat: EG & G model #273 SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#192121

Temperature: 60°C Hg Thermometer SN#00-387 cal 5/16/02 due 5/10/03

E_{corr} = -396 mV Keithley 614 SN#467374 cal 10/4/01 due 10/4/02
 E_{pt} = +191 mV

Solution Deaerates with 99.999% N₂

Specimen Examination: Crevice Corrosion on 5/24 feet of crevice washer
 staining on All Surfaces of Specimen

Data DOE-W41

To Page No. _____

Witnessed & Understood by me, _____

Date _____

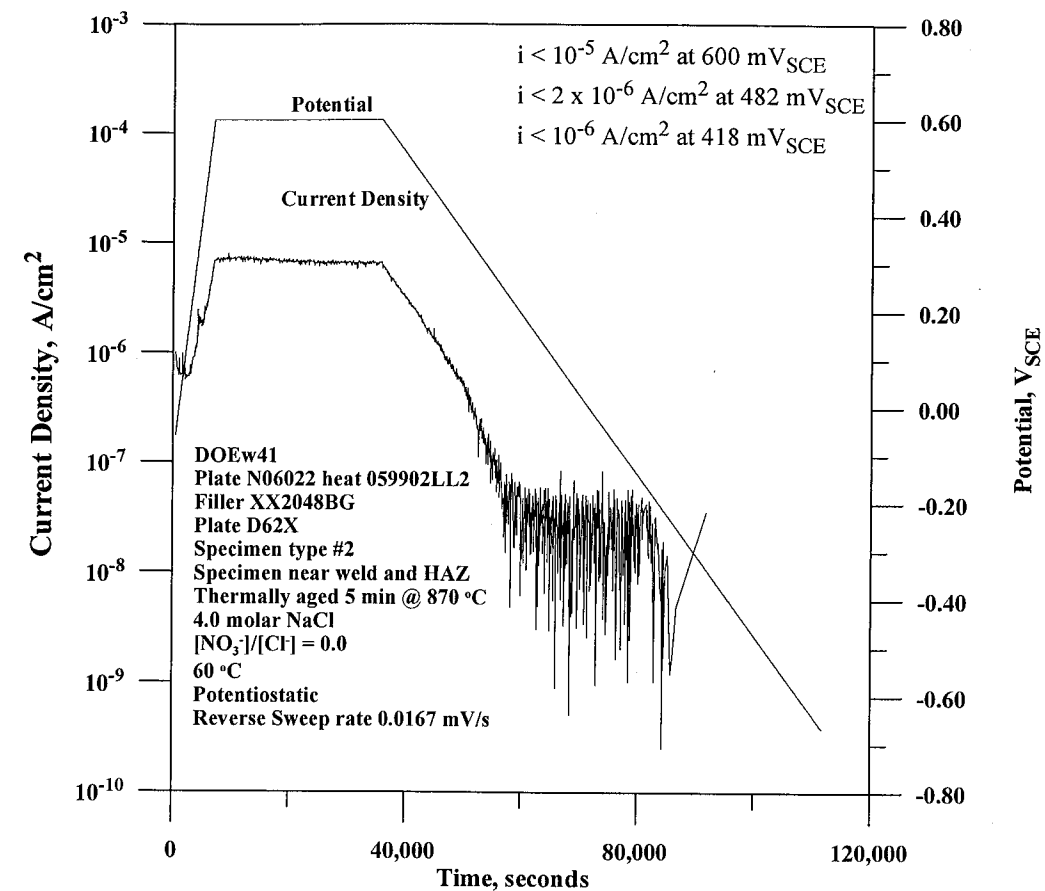
Invented by _____

Date _____

Recorded by _____

9/14/02

From Page No. _____



To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____


Recorded by _____

11/7/2002

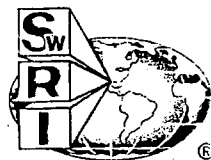
		PURCHASE REQUISITION SOUTHWEST RESEARCH INSTITUTE,™ Texas Toolmakers		PURCHASING PURCHASE ORDER NUMBER 624933	
REQUISITION DATE 8/12/02		ORDER DATE 		REQ. NO. 624933	
DELIVER TO Darrell Dunn/bldg. 57		PURCHASING SELECTED SUPPLIER			
SHIP VIA 					
FOB 		SUPPLIER CODE 			
TERMS 		PHONE 			
ATTN: Mike Ridgway		ATTN 			
PHONE 494-3651		FAX 494-6139			
CITY, STATE 					

LN.	QTY.	UNIT	DESCRIPTION	ORG	PROJECT	ACCT	%	DATE REQUIRED	EST. UNIT PRICE
A	12	EA	Grevice corrosion test specimens 20-01402-571-006, rev. 01, type 1, machined from material away from the weld and heat affected zone as per drawing 20-01402-571-24	20	01402	571	100	9/2/02	133.25
B	12	EA	Grevice corrosion test specimens 20-01402-571-006, rev. 01, type 2, machined from material near the weld and heat affected zone as per drawing 20-01402-571-24	20	01402	571	100	9/2/02	133.25
C	8	EA	Grevice corrosion test specimens 20-01402-571-006, rev. 1, type 3, machined from material that includes the weld and heat affected zone as per drawing 20-01402-571-24	20	01402	571	100	9/2/02	133.25
Quality & Technical Requirements: Specimens machined as per CNWRA drawing 20-01402-571-006, Rev. 1. Dimensions and tolerances identified in CNWRA drawing 20-01402-571-006, Rev. 1 is required. CNWRA drawing 20-01402-571-024 identifies specimen location. Attached drawings and specifications to be used.									TOTAL

1. Government Project? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, CHECK THE APPROPRIATE PROPERTY TYPE (SEE BACK FOR EXPLANATION OF PROPERTY TYPES)		2. QUALITY ASSURANCE? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO a. ASL REQUIRED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO b. QA CODES: Q11 c. INSPECTION CRITERIA d. QA APPROVAL (IF REQUIRED)		3. SOURCING NOTES IF YOU HAVE SELECTED A BRAND NAME OR PARTICULAR MANUFACTURER, WOULD AN EQUIVALENT BRAND OR PRODUCT ALSO SATISFY YOUR NEED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YOU HAVE SUGGESTED A SUPPLIER, AND NO OTHER SUPPLIER WILL MEET YOUR NEEDS, PLEASE ATTACH A MEMO OF EXPLANATION.		4. REPAIRS a. IS THIS REQ. FOR A REPAIR? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO b. IS THE REPAIR ON OR OFF CAMPUS? <input type="checkbox"/> ON <input checked="" type="checkbox"/> OFF c. IF OFF CAMPUS PROVIDE SHIPPING TICKET NO.	
REQUESTOR'S SIGNATURE Darrell Dunn EXT. NO. 6090		DATE 8/12/02		ADMIN. APPROVAL DATE		SEE INSTRUCTIONS ON REVERSE SIDE	

Witnessed & Understood by me,		Date	Invented by	Date	To Page No.
			Recorded by 	11/8/2002	

From Page No. _____

**CNWRA A center of excellence in
earth sciences and engineering**

6220 Culebra Road · San Antonio · Texas, U.S.A. 78228-5166

Darrell S. Dunn
Bldg 57
Phone: 210 522 6090
Fax: 210 522 5184
e-mail: ddunn@swri.org

Description of test specimens from Alloy 22 D62X plate**Reference: CNWRA drawings 20-01402-571-006 rev 1 and 20-01402-571-024**

Crevice corrosion specimens will be machined from a welded Alloy 22 plate (58Ni-22Cr-13.5Mo-3W-3Fe) plate that measures approximately 1.50" thick, 7.87" wide and 17.10" long. The weld is a double U-groove through thickness weld that runs along the 17.10" dimension of the plate. The dimensions of the specimens are provided in CNWRA Drawing 20-01402-571-006 rev 1. Additional drawings are provided to indicate the locations of the specimens with respect to the weld. As shown in drawing 20-01402-571-024 page 1 specimens will be machined from 3 sections of the plate.

The Type 1 specimens will be machined from material located as far from the weld as possible. The specimens will be oriented such that three specimens will be machined from the material thickness as shown in drawing 20-01402-571-024 page 2. The specimens will need to be labeled as Type 1 and are required to be identified as either coming from the near surface or the center of the plate as shown in drawing 20-01402-571-024 page 2.

Type 2 specimens are similar with the exception that the specimens will be machined from entirely base metal near the weld fusion zone. The specimens will need to be labeled as Type 2 and are required to be identified as either coming from the near surface or the center of the plate as shown in drawing 20-01402-571-024 page 2.

Type 3 specimens will be positioned to include the entire welded region as shown in drawings 20-01402-571-024 pages 1 and 2. The specimens will need to be identified as Type 3. Note that the specimens will only be machined from the near surface material and not from the center of the plate/weld thickness as shown in drawing 20-01402-571-024 page 2.

The required number for each type of specimen is identified on drawing 20-01402-571-024 page 1. Dimensional inspection of the specimens per the dimensions and tolerances specified in CNWRA drawing 20-01402-571-006 Rev 1 is required. Material will be provided and all unused material will be required to be returned with the machined specimens.

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/8/2002

From Page No. _____

Texas Toolmakers, Inc.

11411 E. Coker Loop / San Antonio, TX 78216

Phone: (210) 494-3651

Fax: (210) 494-6139

CUSTOMER WORK ORDER / QUOTE

Job No.:	Quote No.:	Date Opened:	Delivery Date:	Customer No.:	Job Taken/Quoted by:	
	1596		NEGOTIABLE	01111	MIKE RIDGWAY	
Customer: SOUTHWEST RESEARCH INSTITUTE				Quote Good For: 90 DAYS	Terms: 1/2% 10 NET 30	
6220 CULEBRA				Customer P.O.:	Contact: DARRELL DUNN	
SAN ANTONIO, TEXAS 78238				Phone No.:	Fax No.:	
				210-684-5111	210-522-5184	
Item	Qty	Part No.	Rev	Part Name	Price Ea.	Total
1	12	20-01402-571-006	1	TYPE 1	133.25	\$1,599.00
2	12	20-01402-571-006	1	TYPE 2	133.25	\$1,599.00
3	8	20-01402-571-006	1	TYPE 3	133.25	\$1,066.00
						\$ 0.00
						\$ 0.00
						\$ 0.00
						\$ 0.00
						\$ 0.00
Work Instructions:					Total	\$4,264.00

All quotations and agreements are contingent upon strikes, fires, availability of materials, and all other causes beyond our control. Prices are subject to change by seller before final acceptance.
FOB: TEXAS TOOLMAKERS, INC.

Page/Sheet _____ of _____

Quality Requirements:	<input type="checkbox"/> None	<input type="checkbox"/> As noted below
Material/Process Certification:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Certificate of Compliance:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Source Inspection:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Documented Dimensional Inspection:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If Yes: 1) <input type="checkbox"/> Specified Dimensions Only, 2) <input type="checkbox"/> Sampling, OR 3) <input type="checkbox"/> 100%		
Authorized TTI Representative:	Mike Ridgway	
Date:	4/26/02	
Customer Acceptance:	Title:	Date:
Customer Comments (if applicable):		
Note: price(s) may be affected if scope of work/inspection is deviated from that quoted.		
For TTI Use Only		
Reviewed by:	Date:	P.O. provided at time of review.
		<input type="checkbox"/> Yes <input type="checkbox"/> No

TTI Form QF-030101

Rev 2

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/8/2002

From Page No. _____

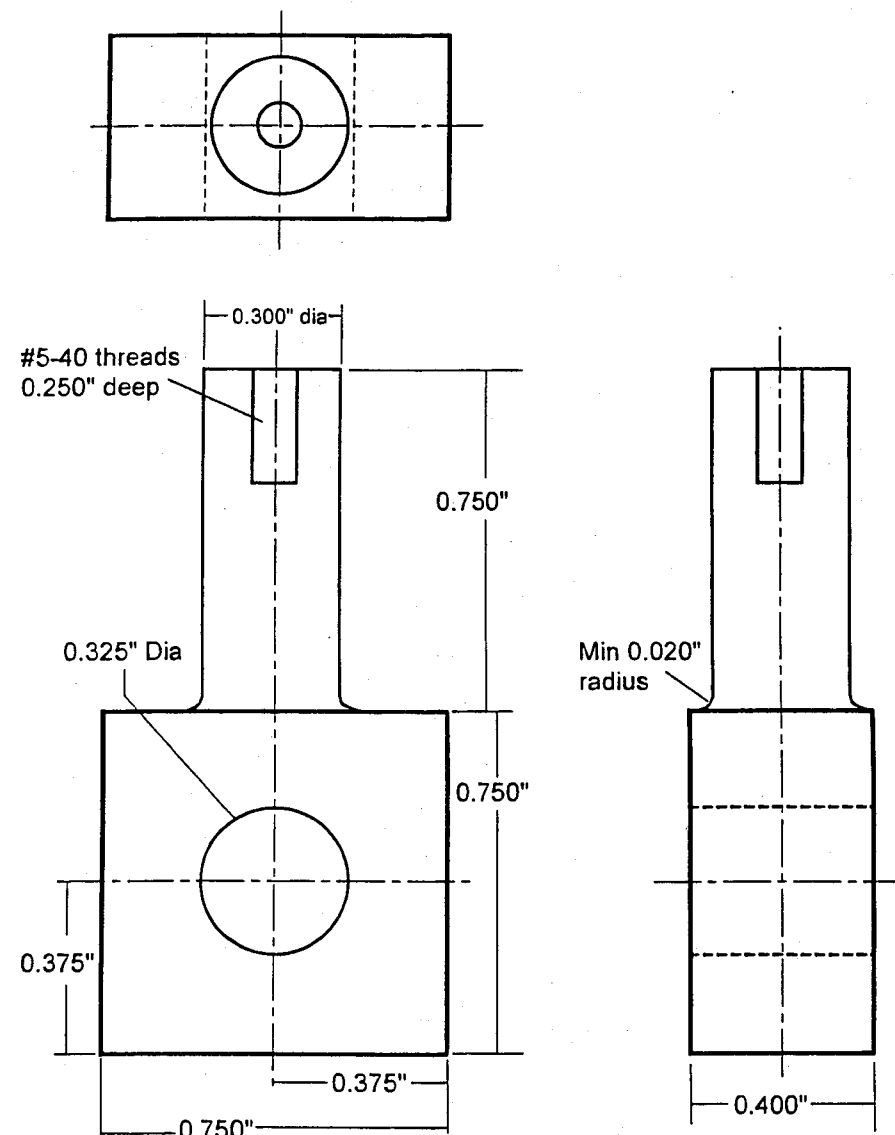
Darrell S. Dunn
SwRI-CNwRA
Phone: (210) 522-6090
Fax: (210) 522-5184
e-mail: ddunn@swri.org

CNWRA Drawing 20-01402-571-006 rev. 1
Dimensional tolerances $\pm 0.005"$
unless otherwise specified
16 rms surface finish

Crevice Repassivation Specimen

To be completed at time of order:

Material: ALLOY 22 D62X
PLATE WELDED BY FRAMATOME
Heat: 059902LL2 & XX2048BG
Specimen Orientation: AS SPECIFIED
IN DRAWING 20-01402-571-0
Other: _____



Darrell Dunn 5/6/2002
Initiated by: D. Dunn Date

V. Jain 5/6/02
Reviewed by V. Jain Date
B. Mabrito 5/6/2002
QA Approval B. Mabrito Date

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

Darrell Dunn 11/8/2002

TITLE _____

From Page No. _____

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

Location of Crevice corrosion specimens
CNWRA Drawing 20-01402-571-024
Dimensional tolerances as specified

Page 1 of 2

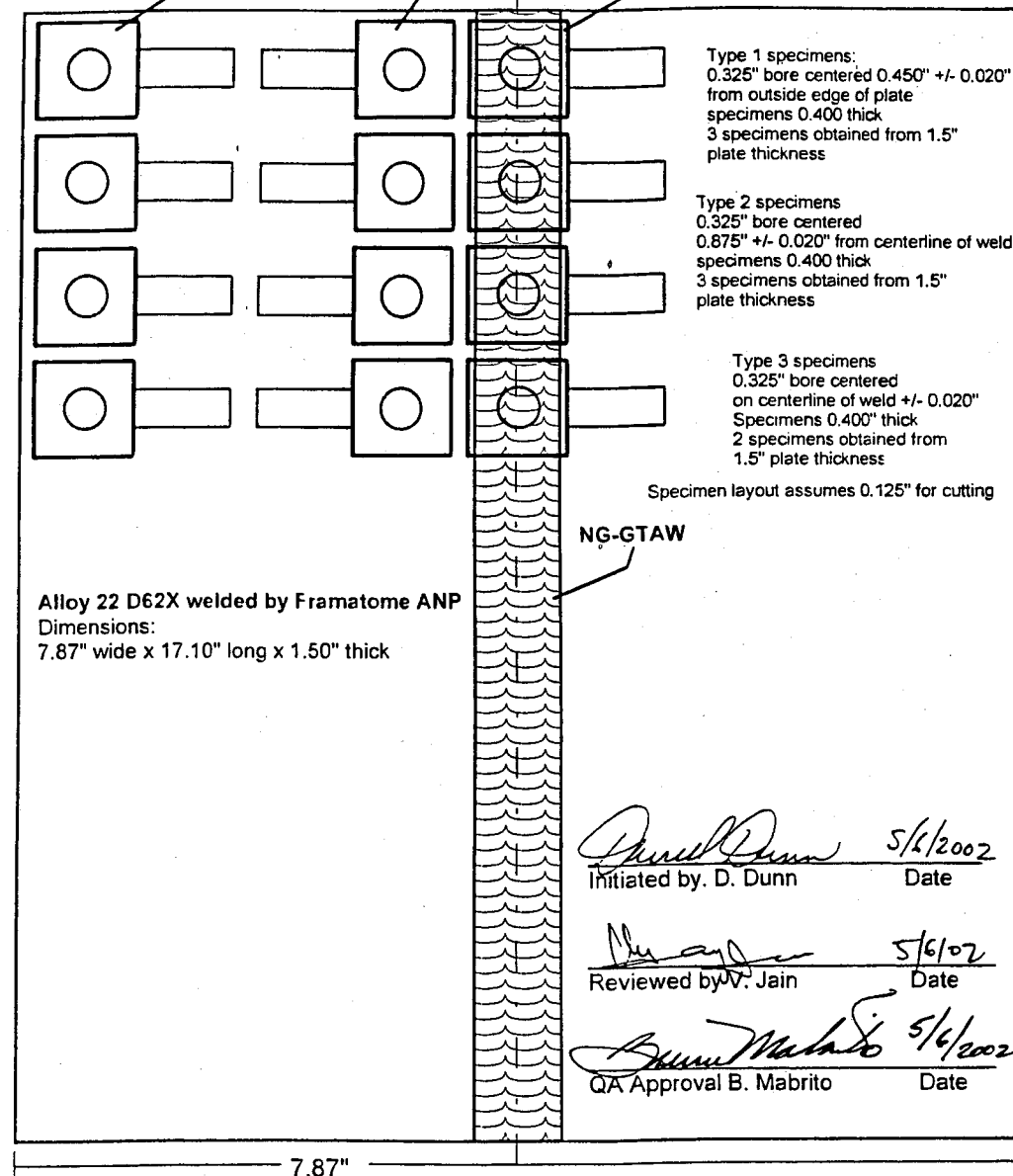
To be completed at time of order:

Material: Welded Alloy 22 NG-GTAW
(58Ni-22Cr-13.5Mo-3V-3Fe)
Heat: 059902LL2 & XX2048BG
Specimen Orientation: As shown
Other: Framatome D62X plate

Type 1 specimen
Far from weld and HAZ
12 specimens
Effect of Alloy composition
and thermal stability

Type 2 specimen
near weld and HAZ
12 specimens
Effect of Alloy composition
and thermal stability

Type 3 specimen
includes weld and HAZ
8 specimens
Effect of weld and
induction annealing



Type 1 specimens:
0.325\" bore centered 0.450\" $\pm 0.020"$
from outside edge of plate
specimens 0.400\" thick
3 specimens obtained from 1.5\"
plate thickness

Type 2 specimens
0.325\" bore centered
0.875\" $\pm 0.020"$ from centerline of weld
specimens 0.400\" thick
3 specimens obtained from 1.5\"
plate thickness

Type 3 specimens
0.325\" bore centered
on centerline of weld $\pm 0.020"$
Specimens 0.400\" thick
2 specimens obtained from
1.5\" plate thickness

Specimen layout assumes 0.125\" for cutting

NG-GTAW

Alloy 22 D62X welded by Framatome ANP
Dimensions:
7.87\" wide x 17.10\" long x 1.50\" thick

Darrell Dunn 5/6/2002
Initiated by: D. Dunn Date

V. Jain 5/6/02
Reviewed by V. Jain Date

B. Mabrito 5/6/2002
QA Approval B. Mabrito Date

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

Darrell Dunn

11/8/2002

From Page No. _____

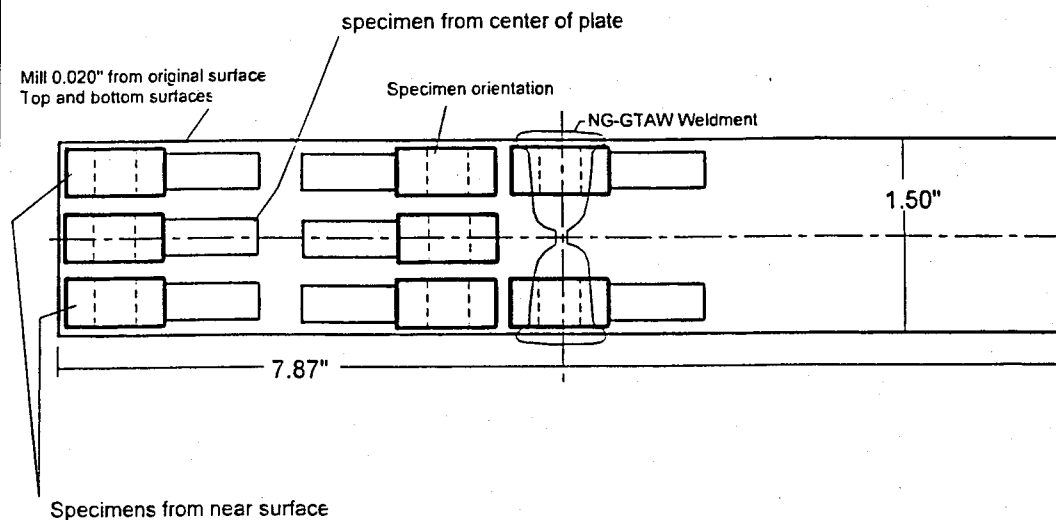
Darrell S. Dunn
SwRI-CNWR
Phone: (210) 522-6090
Fax: (210) 522-5184
e-mail: ddunn@swri.org

Location of Crevice corrosion specimens
CNWRA Drawing 20-01402-571-024

Page 2 of 2

To be completed at time of order:

Material: Welded Alloy 22 NG-GTAW
(58Ni-22Cr-13.5Mo-3W-3Fe)
Heat: 059902LL2 & XX2048BG
Specimen Orientation: As shown
Other: Framatome D62X plate



Darrell Dunn 5/6/2002
Initiated by: D. Dunn Date

V. Jain 5/6/02
Reviewed by: V. Jain Date

B. Mabrito 5/6/2002
QA Approval B. Mabrito Date

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/8/2002

TITLE _____

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. 282134S

TTI JOB #: 33690

DESCRIPTION 32 ea. P/N 20-01402-571-006 Crevice Corrosion Test Specimen
Type 1, Type 2, Type 3

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

Drawing 20-01402-571-24 Rev. 01

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: 10/11/02

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/8/2002

From Page No. _____

DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369001 Part No.: 20-01402-571-006 Rev. No.: 1 P.O. No.: 2821345
 Customer: SWRI Part Name: Crevice Repassivation Specimen Log No.: 2227005-e

Inspection Plan: ☐ 100 % ☒ Specified Dim. ☐ 1st Article Quantity: 3 Sample Size: 3 Accept No.: 3 Reject No.: 0 NR No.: 0

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.301-.302	TIE 102	
2	#5-40Thd X.250 F		#5-40X.250 F	TIE gage + 103	
3	.325		.325	TIE 102	
4	.375		.374	TIE 102	
5	.750		.749-.750	TIE 102	
6	.375		.371-.377	TIE 102	
7	.750		.753-.754	TIE 102	
8	.750		.749	TIE 102	
9	Min .020 R.		.030 R	TIE 024	
10	.400		.400	TIE 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: *[Signature]* Date: 10/10/02 Customer (as applicable) _____ Date _____

TTI Form QF-100201

Rev 2

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/8/2002

From Page No. _____

DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369001 Part No.: 20-01402-571-006 Rev. No.: 1 P.O. No.: 2821345
 Customer: SWRI Part Name: Crevice Repassivation Specimen Log No.: 2227005-e

Inspection Plan: ☐ 100 % ☒ Specified Dim. ☐ 1st Article Quantity: 3 Sample Size: 3 Accept No.: 3 Reject No.: 0 NR No.: 0

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.300-.301	TIE 102	
2	#5-40Thd X.250 F		#5-40X.250 F	TIE 102 + gage	
3	.325		.325	TIE 102	
4	.375		.375	TIE 102	
5	.750		.749	TIE 102	
6	.375		.371-.377	TIE 102	
7	.750		.753	TIE 102	
8	.750		.748	TIE 102	
9	Min .020 R		.030 R	TIE 024	
10	.400		.399	TIE 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: *[Signature]* Date: 10/10/02 Customer (as applicable) _____ Date _____

TTI Form QF-100201

Rev 2

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

11/8/2002

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DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369001

Part No.: 20-01402-571-006

Rev. No.: 1

P.O. No.: 2821345

Customer: SWRT

Part Name: Type 1 Row 3
Crevice Repassivation Specimen

Log No.: 2227005-e

Inspection Plan:
☐ 100 %
☒ Specified Dim.
☐ 1st Article

Quantity: 3

Sample Size: 3

Accept No.: 3

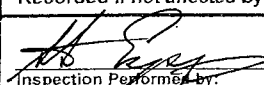
Reject No.: ☒

NR No.: ☒

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.301 - .302	III 102	
2	#5-40Thd X.250 F		#5-40X.250 F	III gage +103	
3	.325		.325	III 102	
4	.375		.374	III 102	
5	.750		.749	III 102	
6	.375		.371-.377	III 102	
7	.750		.752	III 102	
8	.750		.749	III 102	
9	Min .020 R		.030 R	III 024	
10	.400		.400	III 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: 

Date: 10/10/02

Customer (as applicable):

Date:

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Witnessed & Understood by me,

Date

Invented by

Date

Recorded by



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DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.:

Part No.: 20-01402-571-006

Rev. No.: 1

P.O. No.: 2821345

Customer: SWRT

Part Name: Type 1 Row 4
Crevice Repassivation Specimen

Log No.: 2227005-e

Inspection Plan:
☐ 100 %
☒ Specified Dim.
☐ 1st Article

Quantity: 3

Sample Size: 3

Accept No.: 3

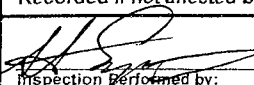
Reject No.: ☒

NR No.: ☒

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.302	III 102	
2	#5-40Thd X.250 F		#5-40Thd X.250	III gage +103	
3	.325		.325	III 102	
4	.375		.375	III 102	
5	.750		.750	III 102	
6	.375		.373-.377	III 102	
7	.750		.751-.753	III 102	
8	.750		.750	III 102	
9	Min .020 R		.030 R	III 024	
10	.400		.399	III 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: 

Date: 10/10/02

Customer (as applicable):

Date:

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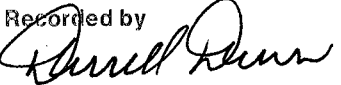
Witnessed & Understood by me,

Date

Invented by

Date

Recorded by



11/8/2002

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DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369002 Part No.: 20-01402-571-006 Rev. No.: 1 P.O. No.: 2821345
Customer: SWRT Part Name: Crevice Repassivation Specimen Log No.: 2227005-e

Inspection Plan: ☐ 100 % ☒ Specified Dim. ☐ 1st Article Quantity: 3 Sample Size: 3 Accept No.: 3 Reject No.: 0 NR No.: 0

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.301-.302	ME 102	
2	#5-40Thd X.250 F		#5-40Thd X.250	ME gage +103	
3	.325		.325	ME 102	
4	.375		.375	ME 102	
5	.750		.749	ME 102	
6	.375		.371-.377	ME 102	
7	.750		.752	ME 102	
8	.750		.750	ME 102	
9	Min .020 R		.030 R	ME 024	
10	.400		.399	ME 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: 

Date

10/11/02

Customer (as applicable)

Date

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Date

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Date

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DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369002 Part No.: 20-01402-571-006 Rev. No.: 1 P.O. No.: 2821345
Customer: SWRT Part Name: Crevice Repassivation Specimen Log No.: 2227005-e

Inspection Plan: ☐ 100 % ☒ Specified Dim. ☐ 1st Article Quantity: 3 Sample Size: 3 Accept No.: 3 Reject No.: 0 NR No.: 0

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.300	ME 102	
2	#5-40Thd X.250 F		#5-40Thd X.250	ME gage +103	
3	.325		.324-.325	ME 102	
4	.375		.374	ME 102	
5	.750		.752	ME 102	
6	.375		.371-.371	ME 102	
7	.750		.753	ME 102	
8	.750		.749	ME 102	
9	Min .020 R		.030 R	ME 102	
10	.400		.400	ME 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: 

Date

10/10/02

Customer (as applicable)

Date

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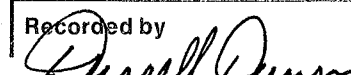
Witnessed & Understood by me,

Date

Invented by

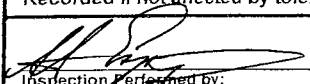
Date

Recorded by

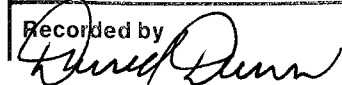


11/8/2002

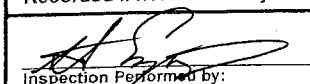
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DIMENSIONAL INSPECTION REPORT					
TEXAS TOOLMAKERS, INC.					
Job No.: 3369002	Part No.: 20-01402-571-006	Rev. No.: 1	P.O. No.: 2821345		
Customer: SWRT	Part Name: Crevice Repassivation Specimen		Log No.: 2227005-e		
Inspection Plan: <input type="checkbox"/> 100 % <input checked="" type="checkbox"/> Specified Dim. <input type="checkbox"/> 1st Article	Quantity: 3	Sample Size: 3	Accept No.: 3	Reject No.: 0	NR No.: 0
Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.301 - .300	TIE 102	
2	#5-40 Thd X.250 W		#5-40 X.250 W	TIE 103 gage	
3	.325		.325	TIE 102	
4	.375		.374	TIE 102	
5	.750		.749	TIE 102	
6	.375		.375	TIE 102	
7	.750		.753	TIE 102	
8	.750		.749	TIE 102	
9	Min .020 R		.030 R	TIE 024	
10	.400		.399	TIE 102	
* Recorded if not affected by tolerance block.					
Sheet 1 of 1					
Inspection Performed by:  Date: 10/11/02 Customer (as applicable) _____ Date _____					
TTI Form QF-100201 Rev 2					

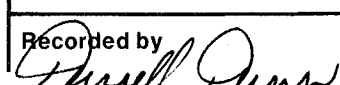
To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by 	11/8/2002

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DIMENSIONAL INSPECTION REPORT					
TEXAS TOOLMAKERS, INC.					
Job No.: 3369002	Part No.: 20-01402-571-006	Rev. No.: 1	P.O. No.: 2821345		
Customer: SWRT	Part Name: Crevice Repassivation Specimen		Log No.: 2227005-e		
Inspection Plan: <input type="checkbox"/> 100 % <input checked="" type="checkbox"/> Specified Dim. <input type="checkbox"/> 1st Article	Quantity: 3	Sample Size: 3	Accept No.: 3	Reject No.: 0	NR No.: 0
Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.300	TIE 102	
2	#5-40 Thd X.250 W		#5-40 X.250 W	TIE 102	
3	.325		.325	TIE 102	
4	.375		.375	TIE 102	
5	.750		.749	TIE 102	
6	.375		.377 - .371	TIE 102	
7	.750		.753	TIE 102	
8	.750		.750 - .751	TIE 102	
9	Min .020 R		.030 R	TIE 024	
10	.400		.400	TIE 102	
* Recorded if not affected by tolerance block.					
Sheet 1 of 1					
Inspection Performed by:  Date: 10/11/02 Customer (as applicable) _____ Date _____					
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DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369003 Part No.: 20-01402-571-006 Rev. No.: 1 P.O. No.: 2821345
 Customer: SWRT Part Name: Crevice Repassivation Specimen Log No.: 2227005-e

Inspection Plan: ☐ 100 % ☒ Specified Dim. ☐ 1st Article Quantity: 2 Sample Size: 2 Accept No.: 2 Reject No.: ☒ NR No.: ☒

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.300	III 102	
2	#5-40thd X.250J		#5-40 X.250J	III 103 & gag	
3	.325		.325	III 102	
4	.375		.375	III 102	
5	.750		.749	III 102	
6	.375		.373-.377	III 102	
7	.750		.754	III 102	
8	.750		.749	III 102	
9	Min .020 R		.030 R	III 024	
10	.400		.400	III 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: *[Signature]* Date: 10/11/02 Customer (as applicable) _____ Date _____
 TTI Form QF-100201 Rev 2

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

[Signature]

11/8/2002

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DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369003 Part No.: 20-01402-571-006 Rev. No.: 1 P.O. No.: 2821345
 Customer: SWRT Part Name: Crevice Repassivation Specimen Log No.: 2227005-e

Inspection Plan: ☐ 100 % ☒ Specified Dim. ☐ 1st Article Quantity: 2 Sample Size: 2 Accept No.: 2 Reject No.: ☒ NR No.: ☒

Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.300	III 102	
2	#5-40thd X.250J		#5-40 X.250J	III 102 & gag	
3	.325		.324	III 102	
4	.375		.375	III 102	
5	.750		.749	III 102	
6	.375		.373-.377	III 102	
7	.750		.754	III 102	
8	.750		.749	III 102	
9	Min .020 R		.030 R	III 024	
10	.400		.399	III 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by: *[Signature]* Date: 10/11/02 Customer (as applicable) _____ Date _____
 TTI Form QF-100201 Rev 2

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

[Signature]

11/8/2002

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From Page No. _____

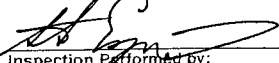
DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369003	Part No.: 20-01402-571-006 Type 3 Row 3	Rev. No.: 1	P.O. No.: 2821345		
Customer: SWRT	Part Name: Crevice Repassivation Specimen		Log No.: 2227005-e		
Inspection Plan: <input type="checkbox"/> 100 % <input checked="" type="checkbox"/> Specified Dim. <input type="checkbox"/> 1st Article		Quantity: 2	Sample Size: 2		
		Accept No.: 2	Reject No.: 0		
		NR No.: 0			
Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.300	TIE 102	
2	#5-40 Thd X.250 F		#5-40 X.250 F	TIE 103 + gage	
3	.325		.324	TIE 102	
4	.375		.377	TIE 102	
5	.750		.749	TIE 102	
6	.375		.373-.377	TIE 102	
7	.750		.753	TIE 102	
8	.750		.749	TIE 102	
9	Min .020 R		.030 R	TIE 024	
10	.400		.400	TIE 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by:  Date: 10/11/02 Customer (as applicable) _____ Date _____

TTI Form QF-100201

Rev 2

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____



11/8/2002

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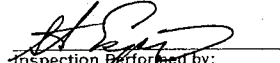
DIMENSIONAL INSPECTION REPORT

TEXAS TOOLMAKERS, INC.

Job No.: 3369003	Part No.: 20-01402-571-006 Type 3 Row 4	Rev. No.: 1	P.O. No.: 2821345		
Customer: SWRT	Part Name: Crevice Repassivation Specimen		Log No.: 2227005-e		
Inspection Plan: <input type="checkbox"/> 100 % <input checked="" type="checkbox"/> Specified Dim. <input type="checkbox"/> 1st Article		Quantity: 2	Sample Size: 2		
		Accept No.: 2	Reject No.: 0		
		NR No.: 0			
Zone	Dim. / Char.	Tolerance*	Actual	Equipment S/N	Comments
1	.300		.300	TIE 102	
2	#5-40 Thd X.250 F		#5-40 X.250 F	TIE 103 + gage	
3	.325		.324	TIE 102	
4	.375		.375	TIE 102	
5	.750		.749	TIE 102	
6	.375		.373-.377	TIE 102	
7	.750		.754	TIE 102	
8	.750		.748	TIE 102	
9	Min .020 R		.030 R	TIE 024	
10	.400		.399	TIE 102	

* Recorded if not affected by tolerance block.

Sheet 1 of 1

Inspection Performed by:  Date: 10/11/02 Customer (as applicable) _____ Date _____

TTI Form QF-100201

Rev 2

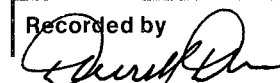
Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____



11/8/2002

From Page No.

Repassivation Potential of Alloy C-22

Objective: Same As pg #1

specimen: DOE Alloy N06022 - Alleghany Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG filler: Specimen Type 3 Row 1 Top
 Contains weld Material - 600 Grit polished finish - with 2 PTFE
 Crevice washers Attached At 50 In-Oz Using Proto #6104
 SN# 139072 cal 8/28/02 due 2/28/03

start wt = 34.2570g Sanjourous Genius SN# 12809099 cal 11/15/02 due 5/15/03
 End wt = 34.2409g

Solution: 1.0 M NaCl
 116.91 g NaCl lot #025149
 + DI water To 2000mls

pH Start = 7.847 Fisher Accumet 950 meter SN# 3340 cal 8/7/02 due 8/7/03
 pH End = 8.023 pH probe # 13-620-296 SN# 2291278P7

Potentiostat = EG & G model # 273 SN# 41108

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 0245092

Temperature: 95°C Hg Thermometer SN# H98-170 cal 5/10/02 due 5/10/03

Ecorr = -620 mV Keithley 645 SN# 0704934 cal 5/26/02 due 5/26/03
 Ep = -150 mV

Solution Deaerated with 99.999% N₂

specimen Examination: No crevice corrosion 1/4 foot of crevice washer
 staining on all surfaces of specimen

* Note: Repolished specimen for further testing
 data DOE-W42

To Page No.

Witnessed & Understood by me,

Date

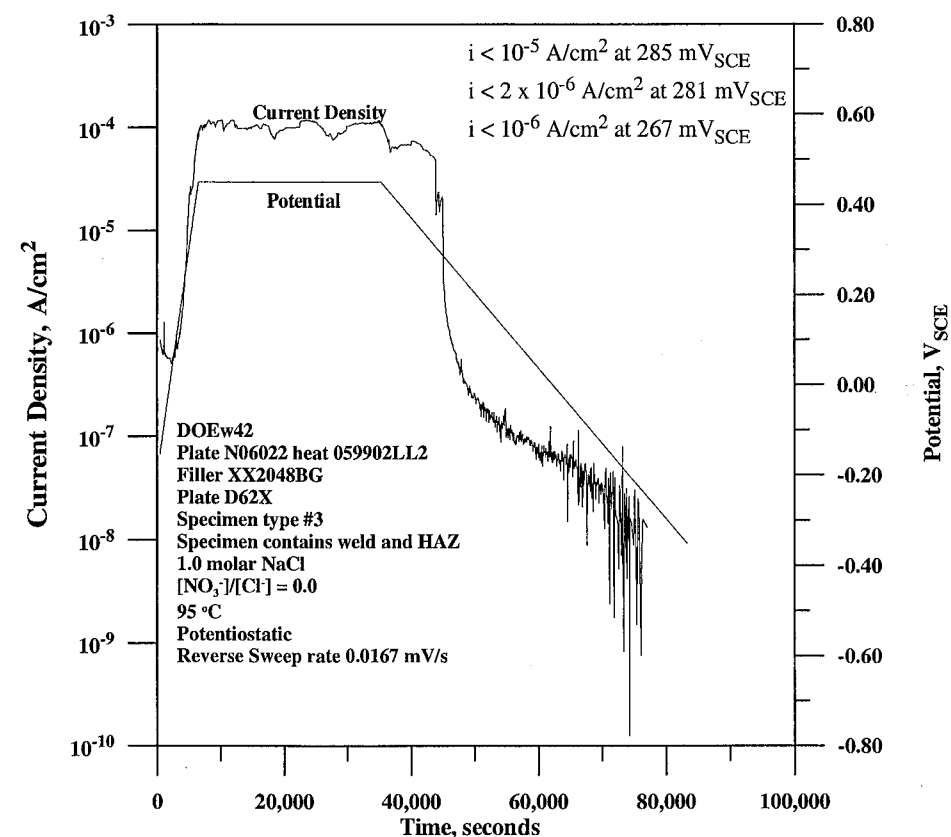
Invented by

Date

Recorded by

12/17/02

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To Page No.

Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

1/7/2003

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Repassivation Potential of Alloy C-22

Objective: See Pg #1

Specimen: DOE Alloy N06022 - Alleghany Ludlum Heat 059902LL2
 Inco Alloy 622 heat xx 2048BG filler - Specimen Type 1 Row 1 Top
 Doesn't contain weld Material - 600 Grit polished finish with 2 PTFE
 Crevice Washers Attached At 50 In-Oz Using Proto #6104
 SN# 139072 cal 8/24/02 Due 2/28/03

Start wt: 34.2900g Santorous Genius SN# 12809099 cal 11/15/02
 End wt: 34.2860g Due 5/15/03

Solution: 0.25 m NaCl
 29.25g NaCl Lot# 025149
 + DI water To 2000mls

pH Start: 7.175 Fisher Accumet 950 meter SN# 3340 cal 8/7/02 Due 8/7/03
 pH End: 8.313 pH probe Fisher 13-620-296 SN# 2291278P7

Potentiostat: EG & G Model #273 SN# 10120

Counter Electrode: PT Flay

Reference: Fisher 13-620-52 SN# 0249108

Temperature: 95°C Hg Thermometer SN# 00-387 cal 5/10/02 Due 5/10/03

E_{corr} = -332mV Keithley 614 SN# 6764934 cal 5/26/02 Due 5/26/03
 E_{pt} = -208mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 2/24 feet of Crevice Washer
 Mild staining on All surfaces of Specimen

Data DOE-W43

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Date _____

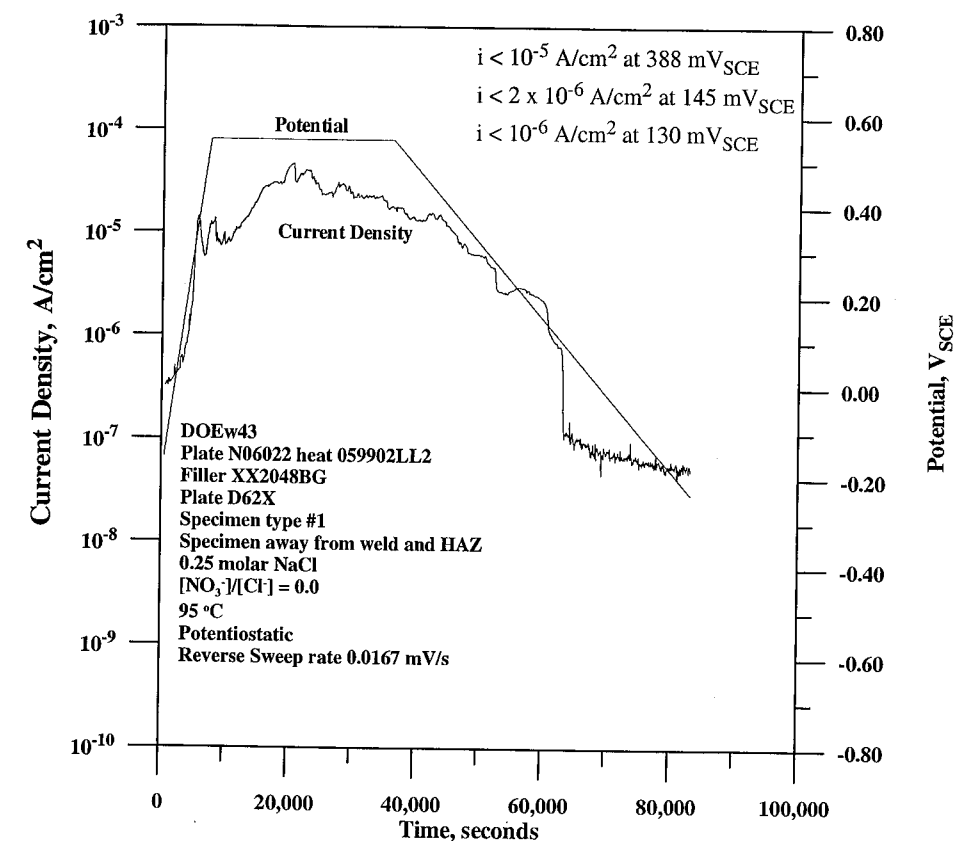
Invented by _____

Date _____

Recorded by _____

12/8/02

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

1/7/2003

From Page No. _____

Repasivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG filler - Specimen Type 3 Row 1 Top
 Contains Weld Material - 600 grit Finish with 2 PTFE Crevice
 Washers Attached At 50 In-Oz Using Photo #6104 SN#139072
 cal 8/28/02 Due 2/28/03

Start wt = 34.15447g Sartorius Genius SN#12809099 cal 4/15/02 Due 5/15/03
 End wt = 34.06158g

Solution: 2.0 M NaCl
 233.82g NaCl Lot # 025149
 + DI water To 2000mls

pH Start: 7.311 Fisher Accumet 950 meter SN#3340 cal 8/7/02 Due 5/7/03
 pH End 7.581 pH probe #13-620-296 SN#2291278P7

Potentiostat = EG & G model #273 SN#41108

Counter Electrode = PT Flay

Reference = Fisher 13-620-52 SN#6249092

Temperature: 95°C Hg Thermometer SN#H98-170 cal 5/10/02 Due 5/10/03

E_{corr} = -443mV Keithley 614 SN#6704934 cal 5/26/02 Due 5/26/03
 E_{pt} = -45 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 2/24 feet of crevice washer - M.b
 Staining on All Surfaces of Specimen

Data DOE W44

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Witnessed & Understood by me,

Date

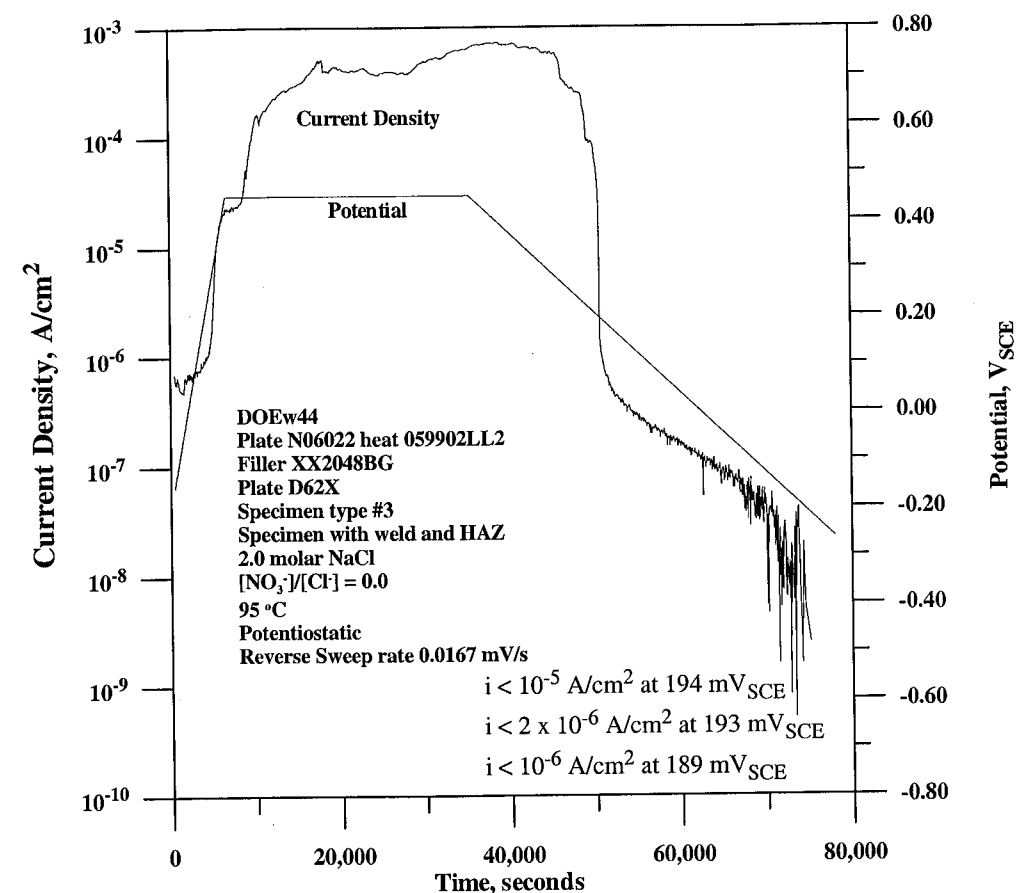
Invented by

Date

Recorded by

1/7/03

From Page No. _____



Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

To Page No. _____

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: See pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 05990242
Incp Alloy 622 heat XX2048BG filler - Specimen Type 2 Row 1 Top
Don't Contain weld Material - 600 Gr. t Finish - with 2 PTFE
Crevice washers Attached At 50 In-Oz Using Proto #604 SN#139072
cal 8/28/02 due 2/28/03

Start wt = 34.05970g Sartorius Genius SN#12809059 cal 11/15/02 due 5/15/04
End wt = 34.04667g

Solution: 0.50 M NaCl
58.45g NaCl Lot# 025149
+ DI water To 2000mls

pH Start: 6.647 Fisher Accumet 950 meter SN#3340 cal 8/7/02 due 8/7/03
pH End: 7.493 pH probe # 13-620-296 SN#2291278P7

Potentiostat: EG & G model # 273 SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#0249108

Temperature: 95°C Hg Thermometer SN#00-387 cal 5/10/02 due 5/10/03

E_{corr} = -478 mV Keithley 614 SN#0764934 cal 5/26/02 due 5/26/03
E_{pr} = -4 mV

Solution Degassed with 99.999% N₂

Specimen Examination: Crevice Corrosion on 3/4 feet of crevice washer - Gold
tint staining on All Surfaces of Specimen

data DOE W45

To Page No. _____

Witnessed & Understood by me,

Date

Invented by

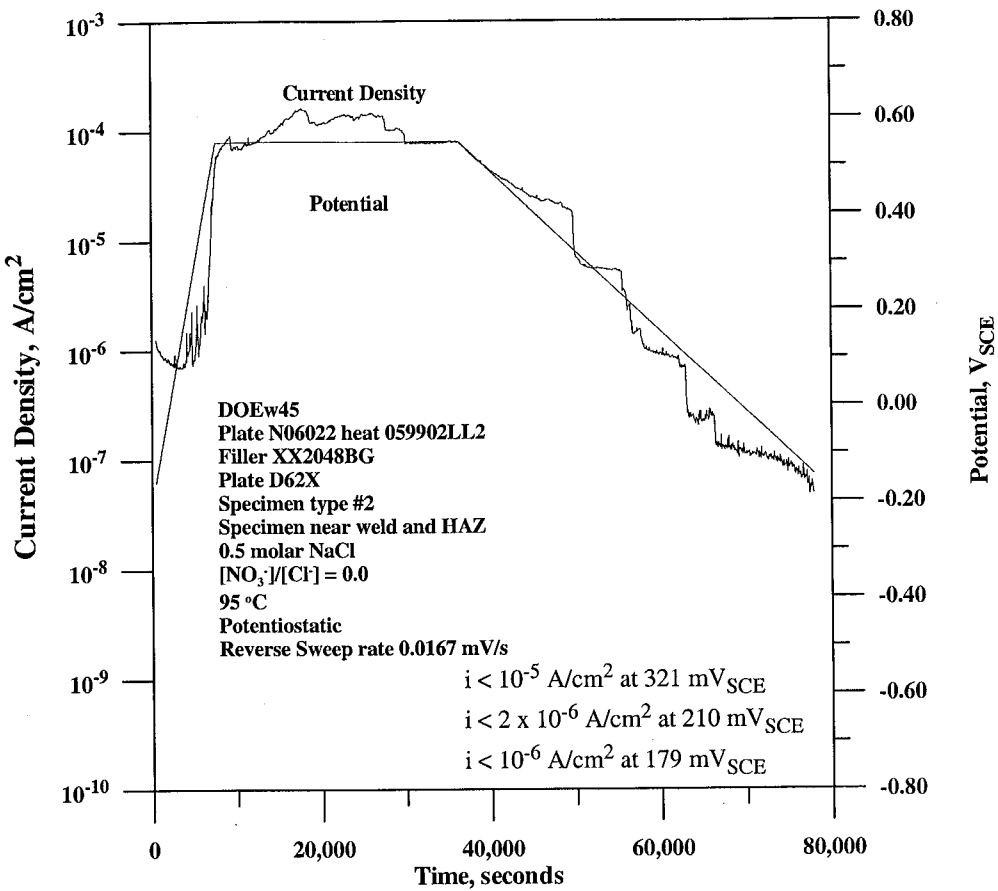
Date

Recorded by

[Signature]

1/7/03

From Page No. _____



Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

To Page No. _____

From Page No. _____

Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG Filler: Specimen Type 2 Row 1 mid
 Contains No Weld Material - 600 Grit polished finish with 2 PTFE
 Crevice Washers Attached At 50 In-Oz Using Proto #6104
 SN# 139072 Cal 8/28/02 Due 2/28/03

Start wt: 34.03475g Santarious Genius SN# 12809099 Cal 11/15/02 Acc 15/03
 End wt: 34.02589g

Solution: 1.0 M NaCl
 116.91g NaCl Lot # 025149
 + DI water to 2000mls

pH Start: 6.439 Fisher Accumet 950 meter SN# 3340 Cal 8/7/02 Due 8/2/03
 pH End: 7.971 pH probe # 13-620-296 SN# 2251278 P7

Potentiostat: EG & G Model #273 SN# 41108

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN# 6249092

Temperature: 95°C Hg Thermometer SN# H98-170 Cal 5/10/02 Due 5/10/03

Ecorr: -563mV Keithley 614 SN# 6704934 Cal 5/26/02 Due 5/26/03
 Ept: -99mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 3/24 feet of crevice washer
 Gold tint staining on All Surfaces of Specimen

Data DOE-W46

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Witnessed & Understood by me, _____

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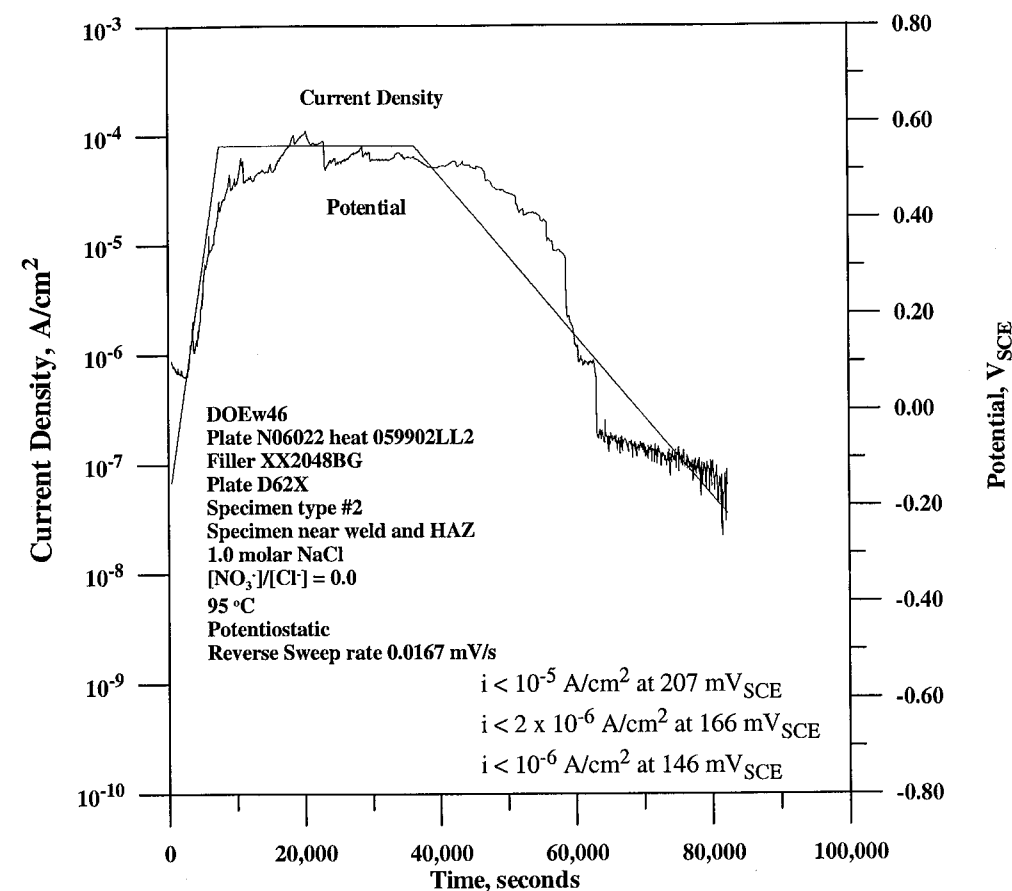
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Date _____

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Date _____

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1/15/2003

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Repassivation Potential of Alloy C-22

objective: See pg #1

specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG filler - Specimen Type 2 Row #1 Bottom
 Contains NO weld Material - 600 grit polished Finish - with 2 PTFE
 crevice washers Attached At 50 In. Oz Using Photo. #6/64
 SN# 139072 cal 8/28/02 Due 2/28/03

Start wt: 34.1904g Santorionic Genius SN#12809099 cal 11/15/02 Due 5/15/03
 End wt: 34.0846g

Solution: 4.0 M NaCl
 467.54g NaCl Lot #025149
 + DI water To 2000ml

pH start: 8.289 Fisher Accumet 950 meter SN#3340 cal 8/7/02 Due 8/7/02
 pH End: 7.639 pH probe #13-620-296 SN#2291278P7

Potentiostat: EG & G model #273 SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#0249108

Temperature: 95°C Hg Thermometer SN#00-387 cal 5/10/02 Due 5/10/03

Ecorr: -484 mV Keithley 614 SN#0764934 cal 5/26/02 Due 5/26/03
 E_p: -111 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 15/24 feet of Crevice Washer
 staining on All Surfaces of Specimen

Data DOE-W47

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Date _____

Invented by _____

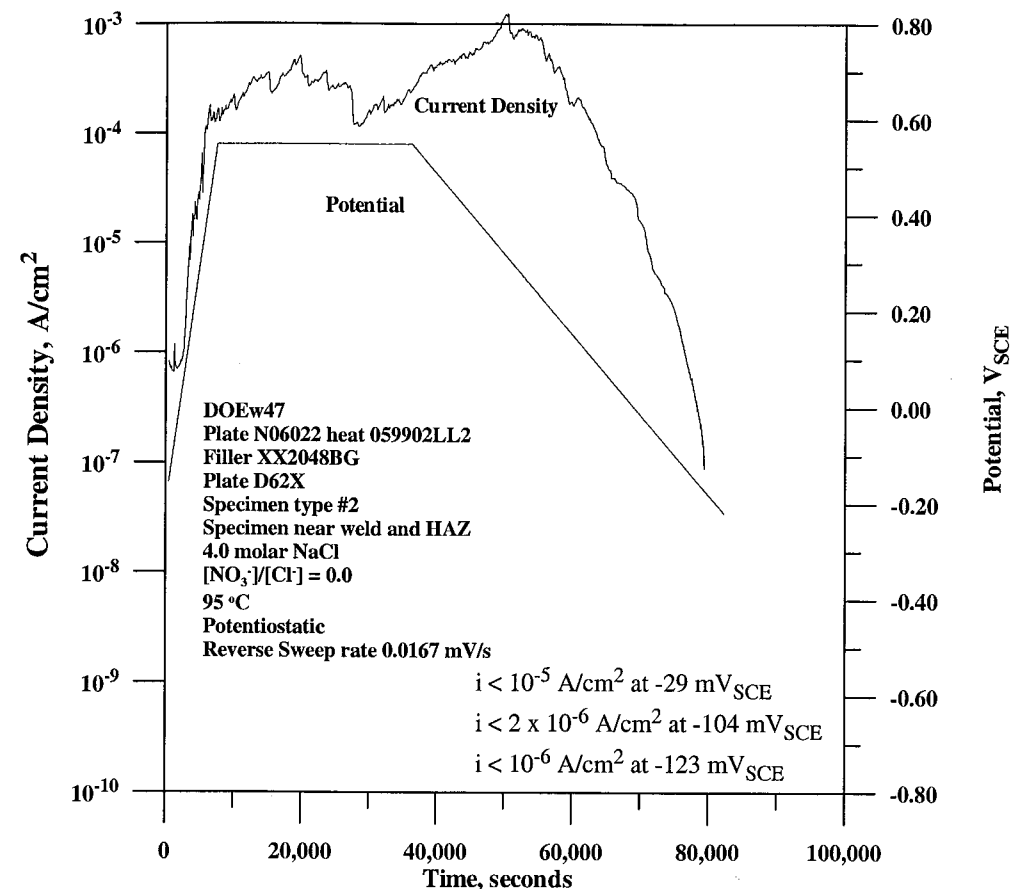
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Witnessed & Understood by me, _____

Date _____

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Date _____

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To keep All Test Data And Graphs on facing Pages
Across from each other this Pg# will be skipped

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Thermal Treatment of Specimens

Specimen Type 2 Row 2 Top - Mid - Bottom
All Specimens In Row 2 will be thermally Aged

Oven = Linobeng Model S1333 SN# 909172

Set point 882°C

Oven Reading Temp: 892°C

Temp Check Omega HH22 SN# T94140 Cal 10/29/02 Due 4/29/03

Thermal Couple #332 Cal 1/14/03 Due 6/14/03

Oven Readings	1:00 min =	870°C
	2:00 min =	872°C
	3:00 min =	880°C
	4:00 min =	882°C
	Remove =	882°C

All Specimens were polished to A 600 Grit Finish Before
thermally Aged Procedure was performed

* Anneal Test Specimens - Water Quench

Specimens Used Type 2 Mid And Bottom
After thermally Aged Procedure

Used Type 3 Row # 2 Top And Bottom
(Web Specimens) Row # 3 Top And Bottom

Oven Set point 1140°C Same Oven Linobeng Model S1333 SN# 909172

Oven Temp Reading 1144°C Omega HH22 SN# T94140 Cal 10/29/02 Due 4/29/03

Thermal Couple #332 Cal 1/14/03 Due 6/14/03

Oven Time 15 min Total on Each Type Specimen

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Repassivation Potential of Alloy C-22

Objective: See pg #1

Specimen: DOE Alloy N06022 - Alleghany Ludlum Heat 05990242
Inco Alloy 622 heat XX2048BG filler - Specimen Type 2 Row 2 Top
Doesn't contain weld Material - 600 Grit polished Finish - with 2 PTFE
Crevice Washers Attached At 50 In-Oz Using Proto #6104
SN#139072 cal 8/28/02 due 2/28/03 * Thermally Aged 870°C for 5 min
(See pg #69)

Start wt: 34.04595g Santorions Genius SN#12809099 cal 11/15/02 due 5/15/03
End wt: 34.04517g

Solution: 4.0 M NaCl
467.54g NaCl
+ DI water To 2000mls

pH Start: 6.463 Fisher Accumet 950 Meter SN#3340 cal 8/7/02 due 8/7/03
pH End: 7.731 pH probe Fisher 13-620-296 SN#2291257 Pb

Potentiostat: EG & G model #273 SN#10120

Counter Electrode: Pt Flay

Reference: Fisher 13-620-52 SN#0249108

Temperature: 60°C Hg Thermometer SN#00-387 cal 5/10/02 due 5/10/03

Ecorr = -417mV Keithley 614 SN#467374 cal 11/28/02 due 11/28/03
Ept = +19mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 7/24 feet of crevice
washer - Staining on All Surfaces

Data DOE-W48

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Witnessed & Understood by me, _____

Date _____

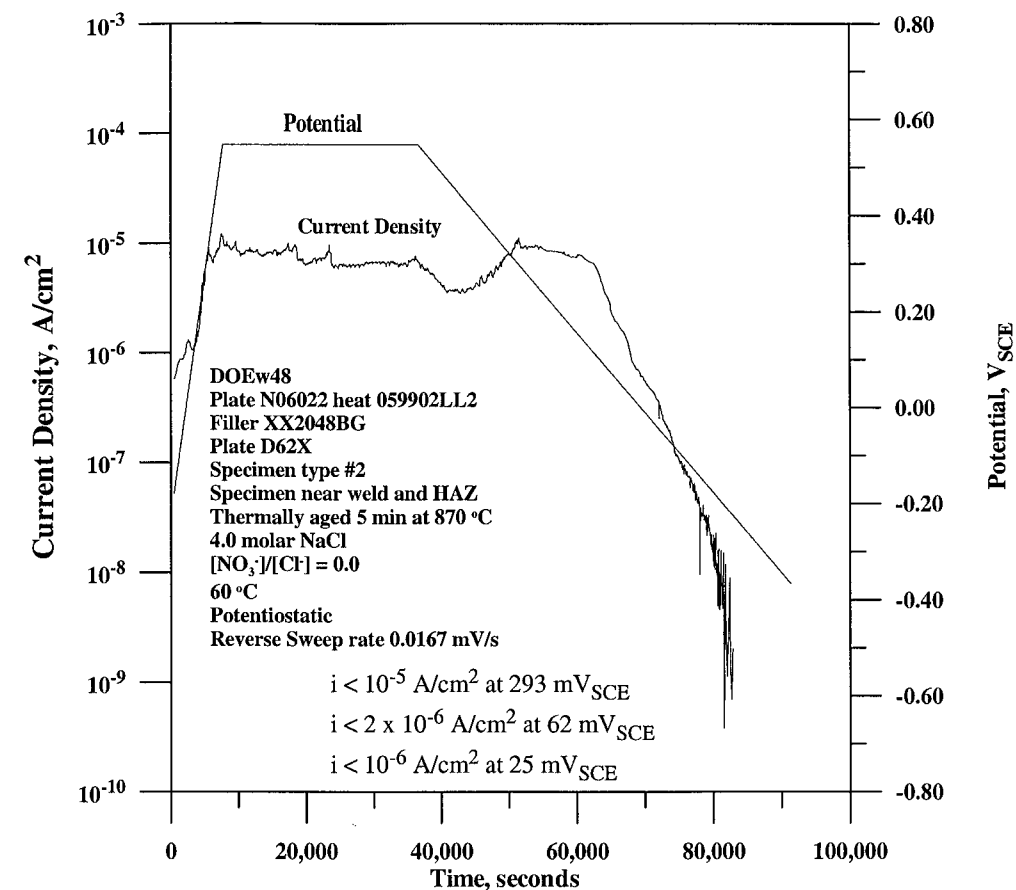
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1/17/03

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Witnessed & Understood by me, _____

Date _____

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Recorded by _____

2/3/2003

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Repassivation Potential of Alloy C-22

objective: see pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
Inco Alloy 622 heat XX2048BG filler - Specimen Type 2 Row 2 Min
Doesn't Contain weld Material - 600 Grit polished Finish - with 2 PTFE
Crevice Washers Attached At 50 In-Oz Using Photo #6104 SN#139072
Cal 8/28/02 due 2/28/03 - Thermally Aged 5 min @ 870°C then Annealed
see pg #69

start wt = 33.8394g Santorious Genius SN#12809099 Cal 11/15/02 due 5/15/03
End wt = 33.75738g

Solution: 1.0 M NaCl
116.9L NaCl Lot #027168
+ DI Water To 2000 mls

pH Start = 7.193 Fisher Accumat 950 SN#3340 Cal 8/7/02 due 8/2/03
pH End = 8.073 pH probe Fisher #13-620-296 SN#2291257P6

Potentiostat: EG & G model #273 SN#10120

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN#0299108

Temperature = 95°C Hg Thermometer SN#00-387 Cal 5/10/02 due 5/10/03

Ecorr = -579 mV Keithley 614 SN#0764934 Cal 5/26/02 due 5/26/03
Ept = -66 mV

Solution Deaerated with 99.999% N₂

Specimen Examination = Crevice Corrosion on 13/24 feet of Crevice Washer
staining on All surfaces of Specimen

Date DOEw49

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Date

Invented by

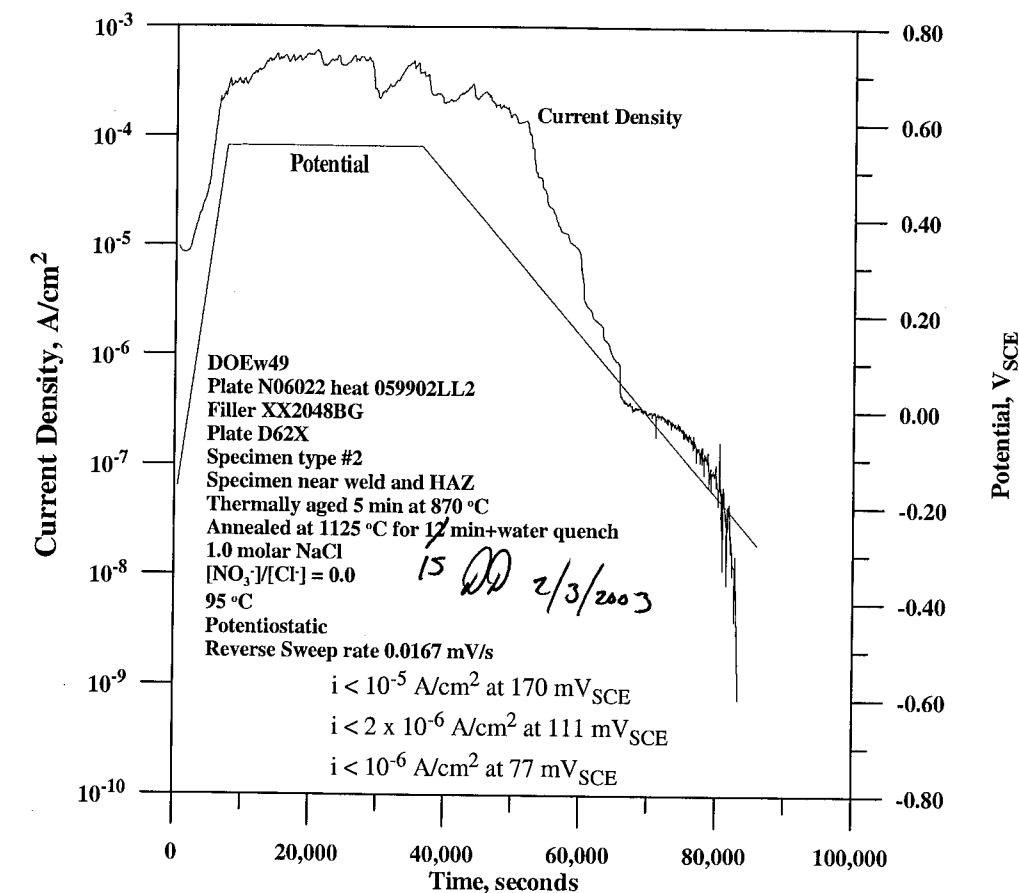
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Invented by

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2/3/2003

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Repassivation Potential of Alloy C-22

Objective: See pg #1

Specimen: DOE Alloy N06022- Alleghany Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG filler - Specimen Type 2 Row 2 Bottom
 Doesn't contain weld Material - 600 Grit polished Finish with 2
 PTFE Crevice Washers Attached At 50 In-Oz Using Proto 6104
 SN# 139072 Cal 8/28/02 Due 2/28/03 Thermally Aged @ 870°C for 5 min then
 Annealed see pg #69

Start wt = 33.87053g Santaricus Genius SN# 12509099 Cal 11/15/02 Due 5/15/03
 End wt = 33.54166g

Solution: 4.0 M NaCl
 467.6g NaCl Lot# 027168
 + DI water to 2000mls

pH Start = 8.137 Fisher Accumet 950 meter SN# 3340 Cal 6/7/02 Due 8/7/03
 pH End = 8.496 pH probe Fisher #13-620-296 SN# 2291257 Pl

Potentiostat = EG & G Model #273 SN# 10120

Counter Electrode = Pt Flag

Reference: Fisher 13-620-52 SN# 0249108

Temperature: 95°C Hg Thermometer SN# 00-387 Cal 5/10/02 Due 5/10/03

Ecorr = -385 mV Keithley 614 SN# 0764934
 Ept = -169 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 23/24 feet

Data DOE WSO

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Date

Invented by

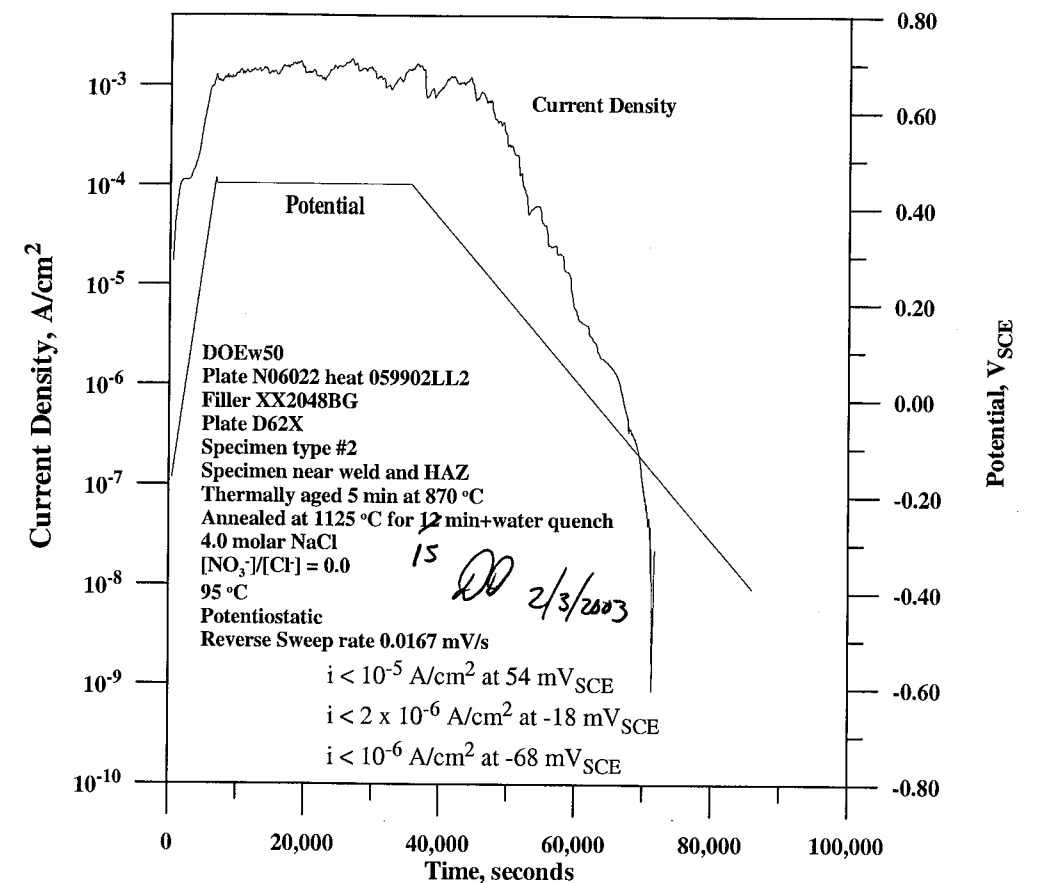
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Date

Recorded by

2/3/2003

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Repassivation Potential of Alloy C-22

Objective: See pg #1

Specimen: DOE Alloy C-22 N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 Heat XX 2048BG filler - Specimen Type 3 Row 1 Bottom
 Contains Weld Material - 600 Grit polished Finish - with 2 PTFE
 Crevice washers Attached At 50 In-Oz Using Pisto #6104
 SN#139072 Cal 8/24/02 Due 2/28/03

Start wt = 34.17456g Sartorius Genius SN#12809099 Cal 11/15/02
 End wt = 34.17428g Due 5/15/03

Solution: 1.0 M NaCl
 116.92g NaCl Lot# 027168
 + DI water To 2000mls

pH Start = 7.110 Fisher Accumet 950 meter SN#3340 Cal 8/7/02 Due 8/2/03
 pH End = 8.017 pH probe Fisher 13-620-296 SN#2291257 P6

Potentiostat: EG & G Model #273 SN#41108

Counter Electrode: PT Flag

Reference: Fisher 13-620-52 SN#0249092

Temperature: 60°C Hg Thermometer SN#H98-170 Cal 5/10/02 Due 5/10/03

Ecorr = -215mV Keithley 614 SN#0704934 Cal 5/26/02 Due 5/26/03
 Ept = +3mV

Solution Deaerated with 99.999% N₂

Specimen Examination: No Crevice Corrosion 1/4 foot of Crevice Washer
 mild staining on all surfaces

Data DOE-W51

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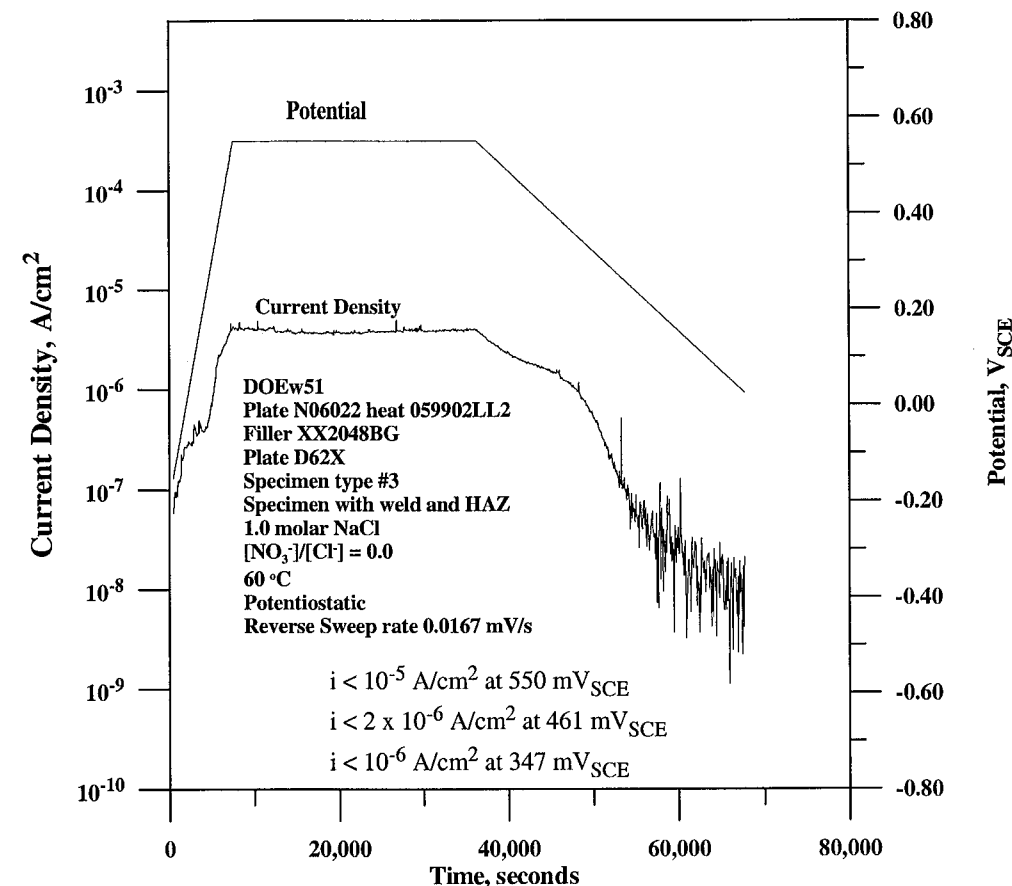
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Date _____

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Recorded by _____

2/12/2003

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Thermal Treatment of Specimens

Specimens = Type 2 Row 3 Top - Mid - Bottom

Type 2 Row 4 Mid

Total of 4 Type 2 Specimens
thermally Aged for 5 min @ 870°C

Oven Linobear Model 51333 SN# 909172

Set point Temperature = 880°C

Oven Temperature Reading = 874.6°C

Temp checked with Omega HH22 SN# T94140
cal 10/29/02 Due 4/29/03

Thermocouple #332 cal 1/14/03 Due 6/14/03

All Specimens were polished To A 600 Grt Finish
Before thermally Aged Procedure was performed

Continue on pg #79 for Annealing procedure

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Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

B-10 [Signature]

2/13/03

TITLE _____

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Thermal Treatment of Specimens

Specimens = Type 2 Row 3 Top - Mid - Bottom

Type 2 Row 4 Mid

Total of 4 Type 2 Specimens
thermally Aged for 5 min @ 870°C
then Annealed @ 1125°C for 15 min - water Quench

Oven Linobear Model 51333 SN# 909172

Set point Temperature = 1125°C

Oven Temperature Reading = 1133°C

Temp checked with Omega HH22 SN# T94140
cal 10/29/02 Due 4/29/03

Thermocouple #332 cal 1/14/03 Due 6/14/03

All Specimens will be Repolished To 600 Grt Finish
After Annealing procedure prior To Testing

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Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

B-10 [Signature]

2/12/03

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Repasivation Potential of Alloy C-22

objective: Same As pg #1

Specimen: DOE Alloy N06022- Alleghany Ludlum Heat 05990242
 Inco Alloy 622 heat XX2048BG filler - Specimens Type 2 Row 3 Top
 Doesn't contain web Material - 600 grit polished Finish - with 2
 PTFE crevice washers Attaching A 50 In. O2 Using Photo 6104
 SN# 139072 cal 8/28/02 due 2/28/03 - * Specimen thermally Aged then
 Annealed See pg# 78-79 for Procedure *

Start wt = 34.12414g Santarous Genius SN# 12809099 cal 11/15/02
 End wt = 34.67759g Due 5/15/03

Solution = 0.25 M NaCl
 29.157g NaCl lot# 027168
 + DI water to 2000mls

pH Start = 5.884 Fisher Accumet 950 meter SN# 3340 cal 8/7/02 due 8/7/03
 pH End = 8.601 pH probe #13-620-296 SN# 2291278 P6

potentiostat = EG & G model # 273 SN# 41108

Counter Electrode: PT Flay
 Reference: Fisher 13-620-52 SN# 0249092

Temperature: 95°C Hg Thermometer SN# H98-170 cal 5/10/02 due 5/10/03

E_{corr} = -442mV Keithley 614 SN# cal due
 E_{pt} = -35mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 1/24 feet of crevice washers
 staining on All surfaces of Specimen

Data DOE-W 52

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Witnessed & Understood by me,

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Invented by

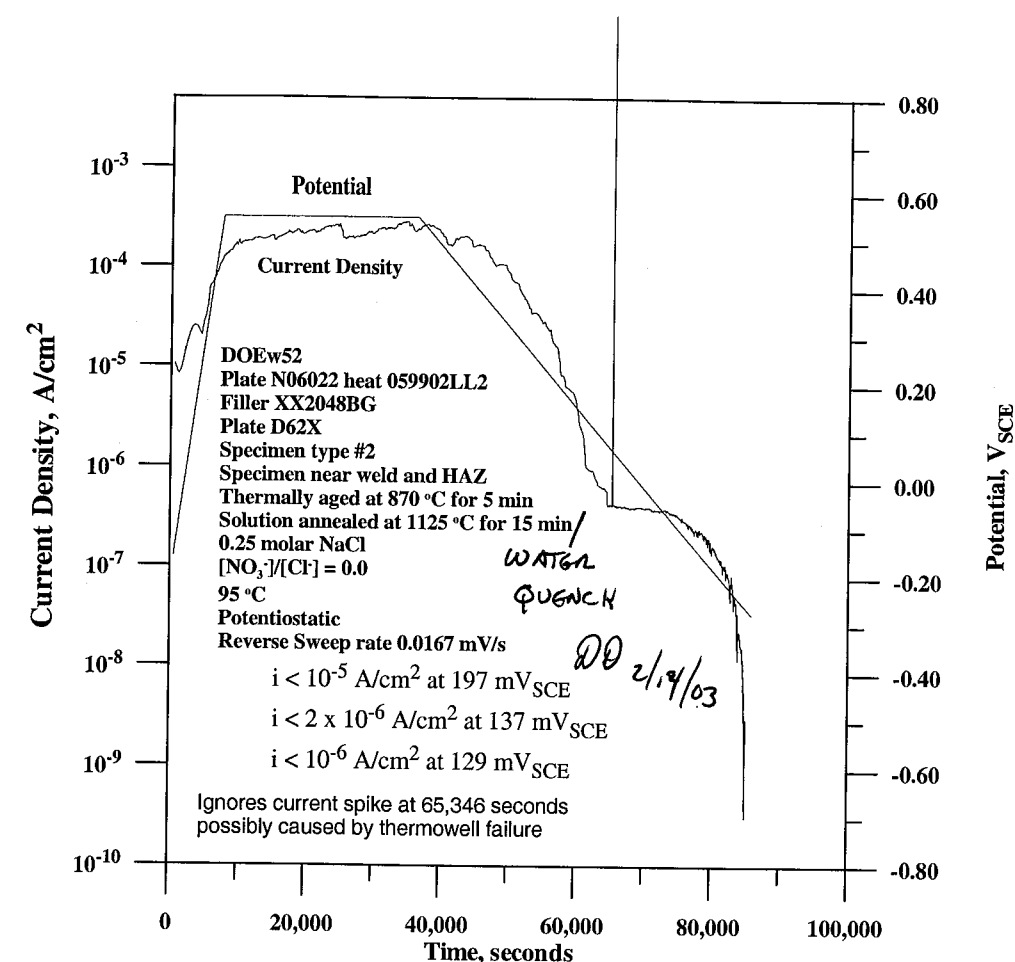
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Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

Dunlop Dunn

2/14/2003

From Page No. _____ Repassivation Potential of Alloy C-22

Objective: See pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
Inco Alloy 622 Heat XX2048BG filler - Specimen Type 2 Row 4 mid
Doesn't contain weld Material - 600 Grit polished Finish with 2 PTFE
Crevice washers Attached At 50 In Oz Using Photo #6104
SN#139072 cal 8/28/02 due 2/28/03 * Specimen thermally Aged then
Annealed See pg # 78-79 for Procedure *

Start wt = 34.07360g Sartorius Genius SN#12809099 cal 11/15/02
End wt = 34.00971g Due 5/15/03

Solution: 0.5 M NaCl
58.62g NaCl lot # 027168
+ DI water To 2000mls

pH start = 6.227 Fisher Accumet 950 meter SN#3340 cal 8/7/02 due 8/7/03
pH End = 8.051 pH probe Fisher #13-620-296 SN#2291257P6

Potentiostat: EG & G Model #273 SN#10120

Counter Electrode: Pt Flay
Reference: Fisher 13-620-52 SN#0251439

Temperature: 95°C H₂ Thermometer SN#00357 cal 5/15/02
Due 5/10/03

E_{corr} = -506 mV Keithley 614 SN#
E_{pt} = -337 mV cal due

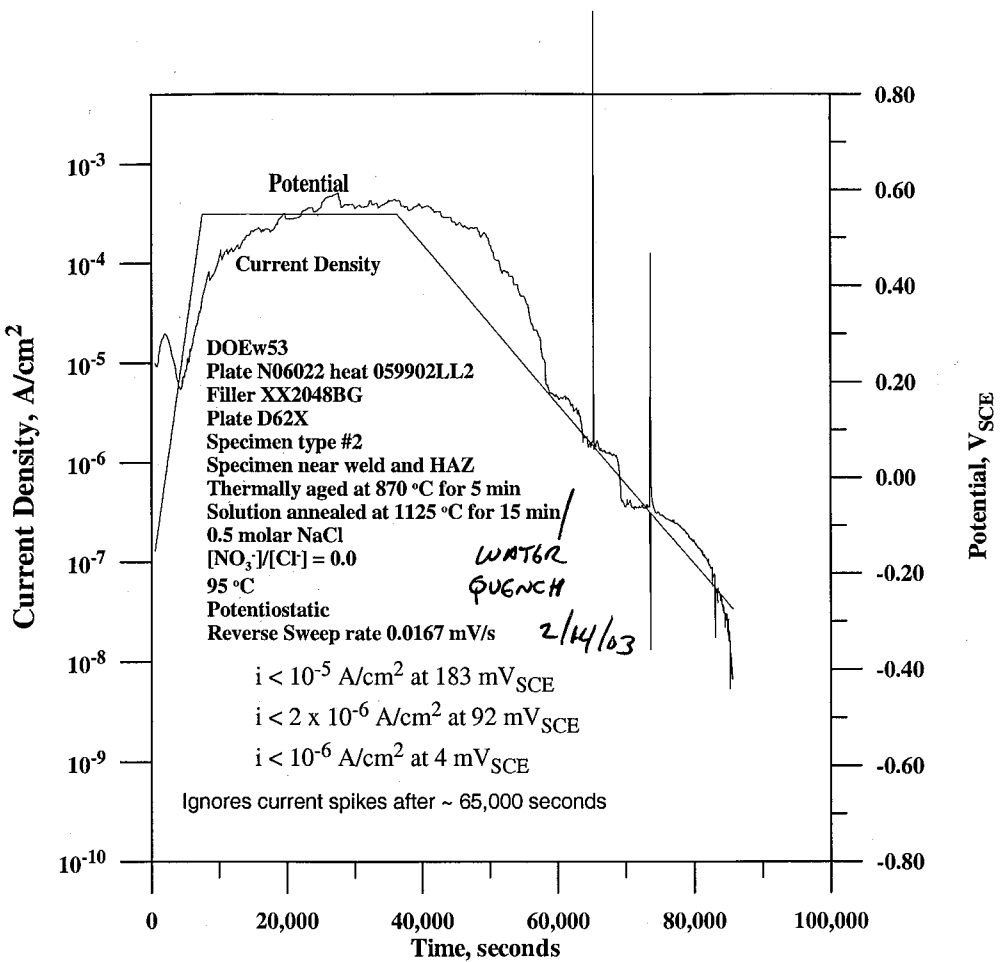
Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 13/24 feet of Crevice Washer
staining on All Surfaces of Specimen

Date DOE W 53 To Page No. _____

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		Recorded by	2/14/2003

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Repasivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022- Allegheny Ludlum Heat 059902LL2
Inco Alloy 622 heat XX2048BG filler - Specimen Type 2 Row 3 Mid
Doesn't Contain weld Material - 600 Grit polished Finish - with 2 PTFE
Crevice Washers Attached At 50 In-Ox Using Proto #6104
SN#139072 cal 8/28/02 due 2/25/03 * Specimen thermally Aged then
Annealed See pg# 78-79 for procedure *

Start wt = 34.02318g Sartorius Genius SN#12809099 cal 11/15/02 due 5/15/03
End wt = 34.02139g

Solution: 1.0 M NaCl
116.98g NaCl lot # 027168
+ DI water to 2000 ml

pH Start: 7.278 Fisher Accumet 950 meter SN#3340 cal 8/7/02 due 8/7/03
pH End: 7.965 pH probe #13-620-296 SN#2291257 PL

Potentiostat: EG & G Model #273 SN#41108

Counter Electrode: PT Flay

Reference: Fisher 13-620-52 SN#0249092

Temperature: 60°C H₂ thermometer SN#H98-170 cal 5/10/02 due 5/10/03

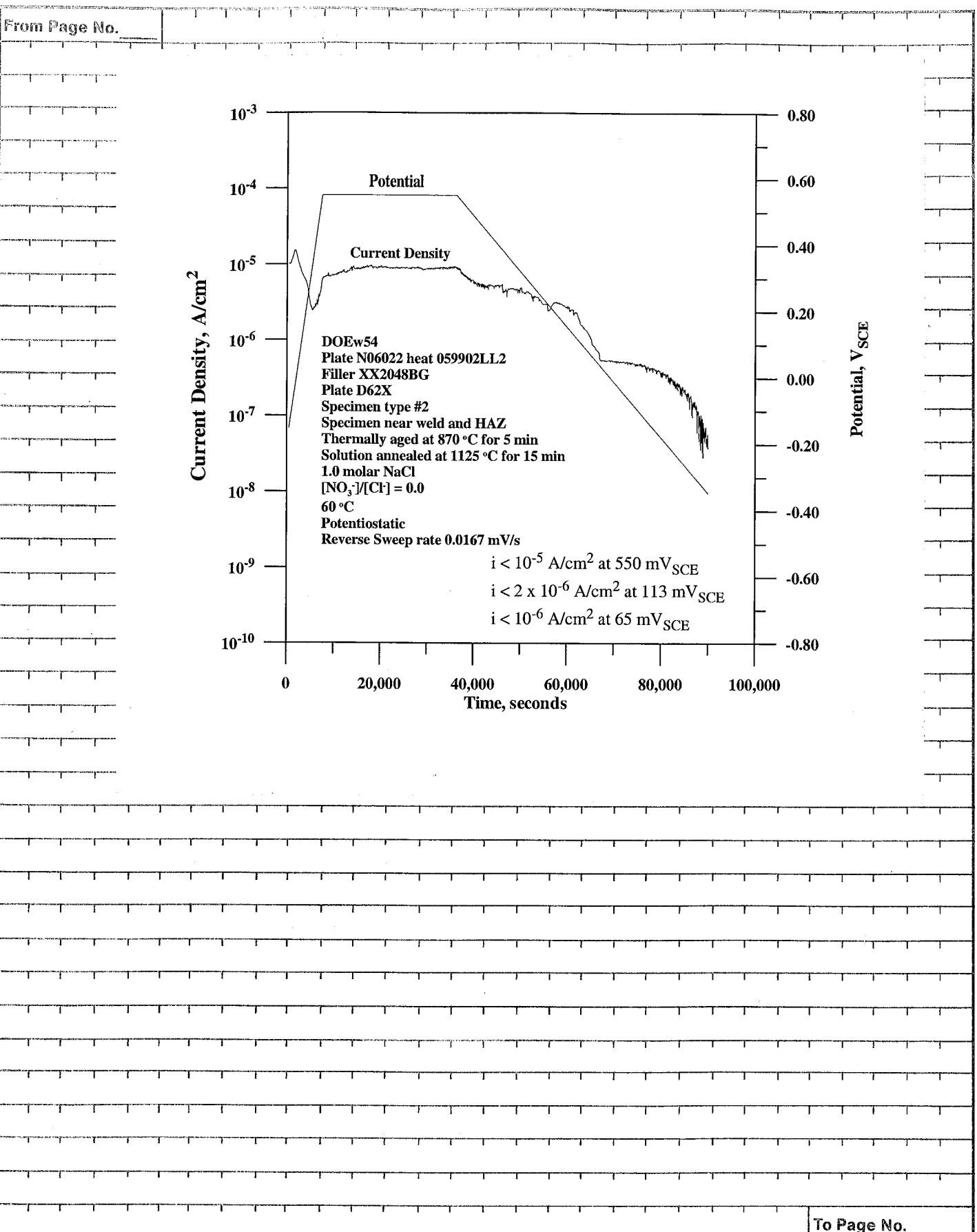
Ecom = -523mV Keithley 614 SN#0704934 cal 5/26/02 due 5/26/03
Ept = +50mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 3/4 feet of crevice washer milo
Lite blue tint staining on All Surfaces

data DOE-W54 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	2/14/03



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		Recorded by	2/17/03

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Repasivation Potential of Alloy C-22

objective: See pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 InCO Alloy 622 Heat XX2048BG - Filler - Specimen Type 2 Row 3 Bot
 Doesn't Contain Weld Material - 600 grit polished Finish - with 2 PTFE
 Crevice Washers Attached At SD In-O₂ Using Photo #6104
 SN#139072 Cal 8/28/02 Due 2/28/03 * Specimen thermally Aged
 then Annealed See pg #78-79 for procedure *

Start wt: 34.05847g Santarous Genius SN#12809099 Cal 11/15/02 Due 5/15/03
 End wt: 34.05261g

Solution 4.0 M NaCl
 468.05g NaCl lot # 027878
 + DI water to 2000 ml

pH Start: 8.598 Fisher Accumet 950 meter SN#3340 Cal 8/7/02 Due 8/7/03
 pH End: 7.532 pH probe Fisher 13-620-296 SN#2291257 Pl

Potentiostat: EG & G Model #273 SN#10120

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN#0251439

Temperature: 60°C Hg Thermometer SN#00-387 Cal 5/10/02 Due 5/10/03

E_{corr} = -901mV Keithley 614 SN#0764934 Cal 5/26/02
 E_{pt} = -161mV Due 5/26/03

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 18/24 feet of crevice washers
 m/o Blue tint staining on All Surfaces

Data DOE-W55

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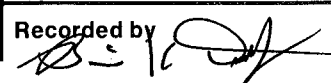
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Date

Invented by

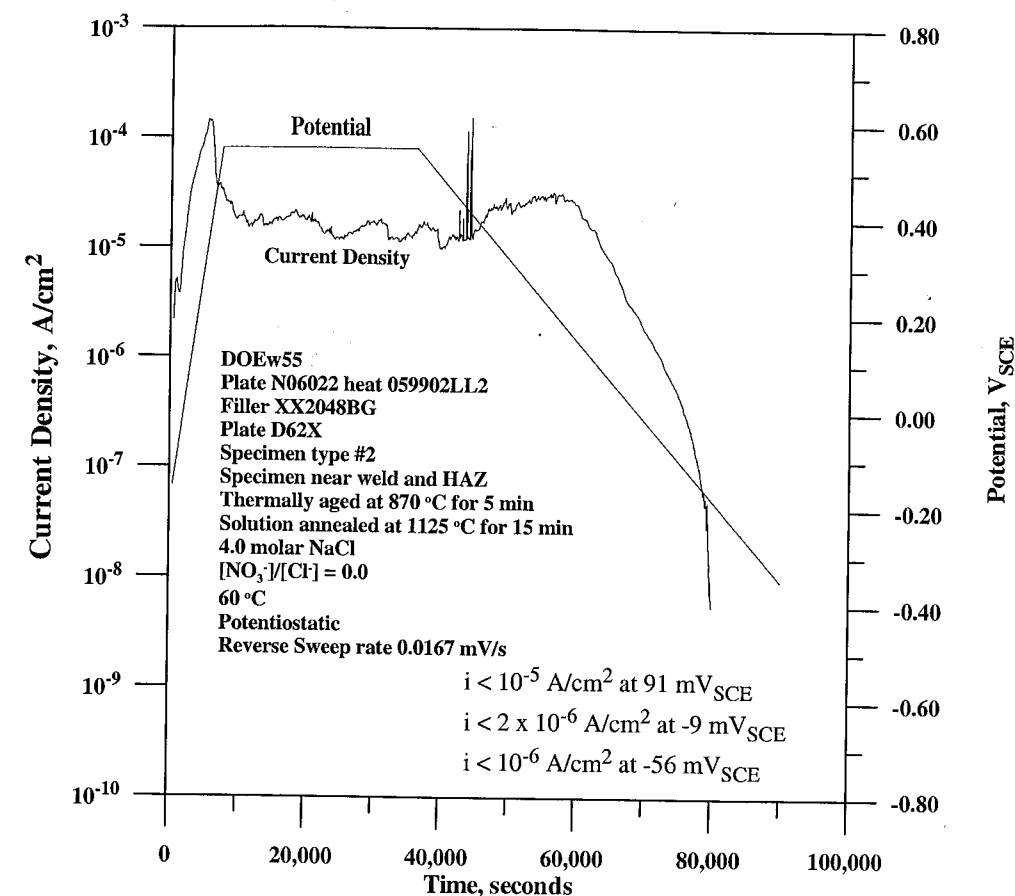
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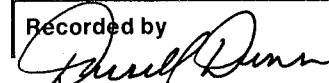
Witnessed & Understood by me,

Date

Invented by

Date

Recorded by



2/17/03

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Repassivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
Inco Alloy 622 heat XX2048BG Filler: Specimen Type 3 Row 2 Top
Contains weld Material - 600 grit polished finish with 2 PTFE
Crevice Washers Attached At SU In-Oz Using Parts #6104
SN# 139072 cal 8/28/02 due 2/28/03 * Specimen Annealed sec pg #69 *

Start wt = 34.16008g Santorous Genius SN# 12509099 cal 11/5/02 due 9/10/03
End wt = 34.13656g

Solution: 0.25 m NaCl
29.229g NaCl Lot #027878
+ DI water To 2000ml

pH Start = 7.822 Fisher Accuret 950 meter SN#3340 cal 8/1/02 due 8/7/03
pH End = 7.174 pH probe #13-620-296 SN#2291257 P6

Potentiostat: EG & G model #273 SN#41108

Counter Electrode: PT Flg

Reference: Fisher 13-620-52 SN#6249092

Temperature = 95°C Hg Thermometer SN#H98-170 cal 5/10/02 due 5/10/03

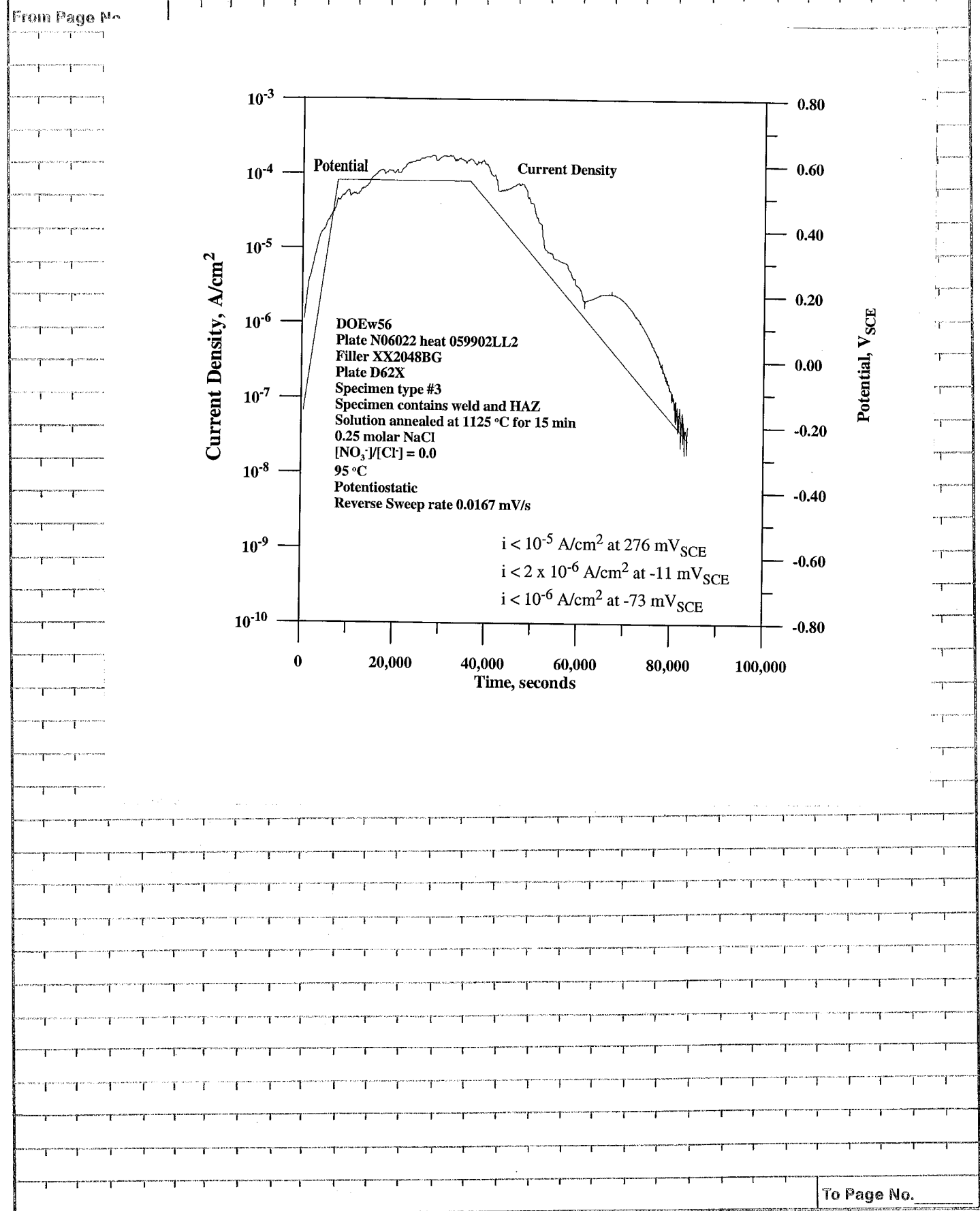
E_{corr} = -366mV Keithley 614 SN#0704934 cal 5/26/02 due 5/26/03
E_{pt} = -93mV

Solution Degassed with 99.999% N₂

Specimen Examination: Crevice Corrosion on 5/4 feet of Crevice Washer
staining on All surfaces of Specimen

To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	2/17/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	2/24/03

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Repassivation Potential of Alloy C-22

Objective: same as pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 05902LL2
 Inco Alloy 622 heat XX204886 filler Specimen Type 3 Row 2 Bottom
 Contains Weld Material - 600 grit polished finish - with 2 PTFE
 Crevice washers Attached At 50 In. Or Using Probe # 6104 SN# 139072
 Cal 5/28/02 Due 2/28/03 * Note Specimen Annealed see pg #69

Start wt = 34.02337, Sartorius Genius SN# 12809099 cal 11/15/00 due 5/15/03
 End wt = 33.92845g

Solution = 0.5 M NaCl
 58.45g NaCl lot # 027878
 + DI water To 2000mls

pH start = 5.817 Fisher Accumet 950 meter SN# 3340 cal 8/7/02 due 8/7/03
 pH End = 7.924 pH probe # 13-620-296 SN# 2291257 P6

Potentiostat: EG&G model # 273 SN# 41108

Counter Electrode: Pt Flay

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 95°C Hg Thermometer SN# H98-170 cal 5/10/02 due 5/10/03

Ecorr = -597 mV Keithley 614 SN# 0704934 cal 5/26/02 due 5/26/03
 Ept = -121 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 9/24 feet of Crevice
 Washer - Staining on All Surfaces of Specimen

Data DOE-W57

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

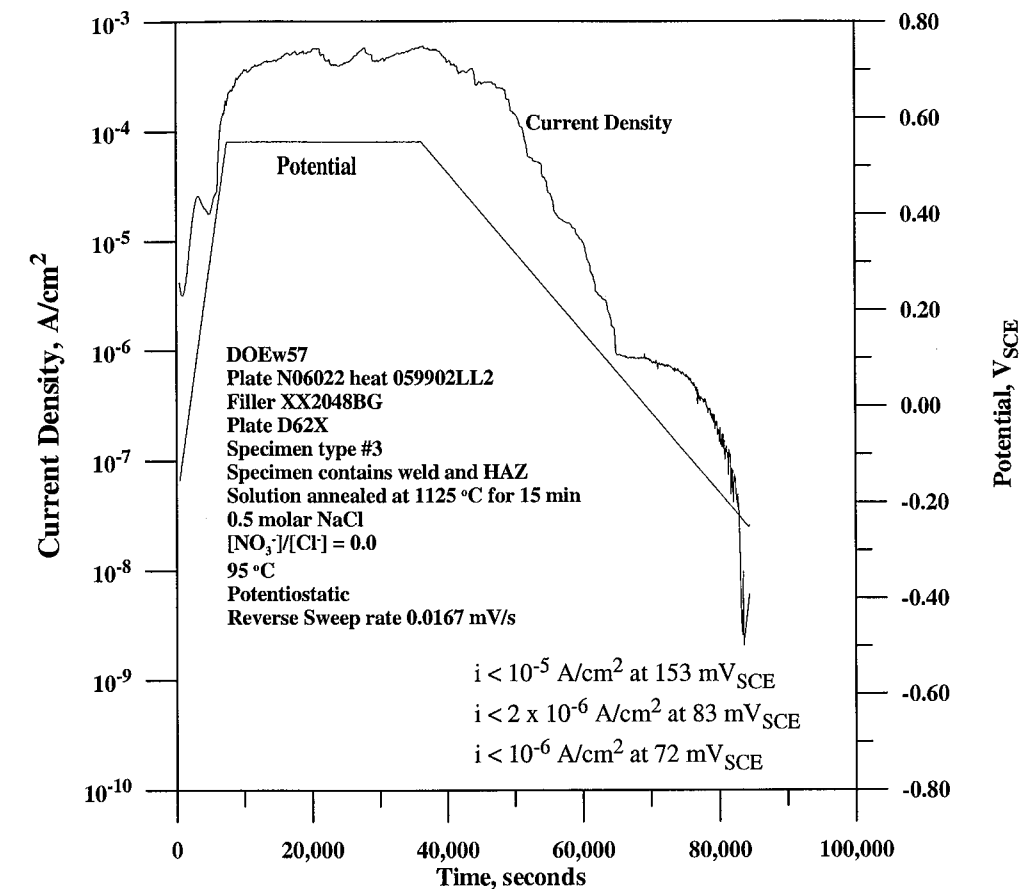
Recorded by _____

2/19/03

B. K. D. J.

TITLE _____

From Page No. _____



Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

2/20/2003

B. K. D. J.

From Page No.

Repasivation Potential of Alloy C-22

Objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
 Inco Alloy 622 heat XX2048BG filler - Specimen Type 3 Row 3 Top
 Contains weld Material: 600 Grt polished finish - with 2 PTFE
 Crevice Washer Attached At 50 In-Oz Using Photo # 6104 SN# 139072
 Cal 8/28/02 Due 2/28/03 * Note: specimen Annealed See pg # 69

Start wt = 34.07140g Sartorius Genius SN# 12809099 Cal 11/15/02
 End wt = 33.98849g Due 5/15/03

Solution: 1.0 M NaCl
 116.89g NaCl Lot # 027878
 + DI water To 2000mls

pH Start = 6.899 Fisher Accumet 950 meter SN# 3340 Cal 8/7/02 Due 8/7/03
 pH End = 7.829 pH probe # 13-620-296 SN# 2291257 Pl6

Potentiostat: EG&G Model #273 SN# 41108

Counter Electrode: Pt Flag

Reference: Fisher 13-620-52 SN# 0249092

Temperature: 95°C Hg Thermometer SN# H98-170 Cal 5/10/02 Due 5/10/03

Ecorr = -371 mV Karlhex 614 SN# 0704934 Cal 5/26/02 Due 5/26/03
 Ept = 1228 mV

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 9/24 feet of Crevice Washer
 staining on All Surfaces of Specimen

Data DOE-W58

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Witnessed & Understood by me,

Date

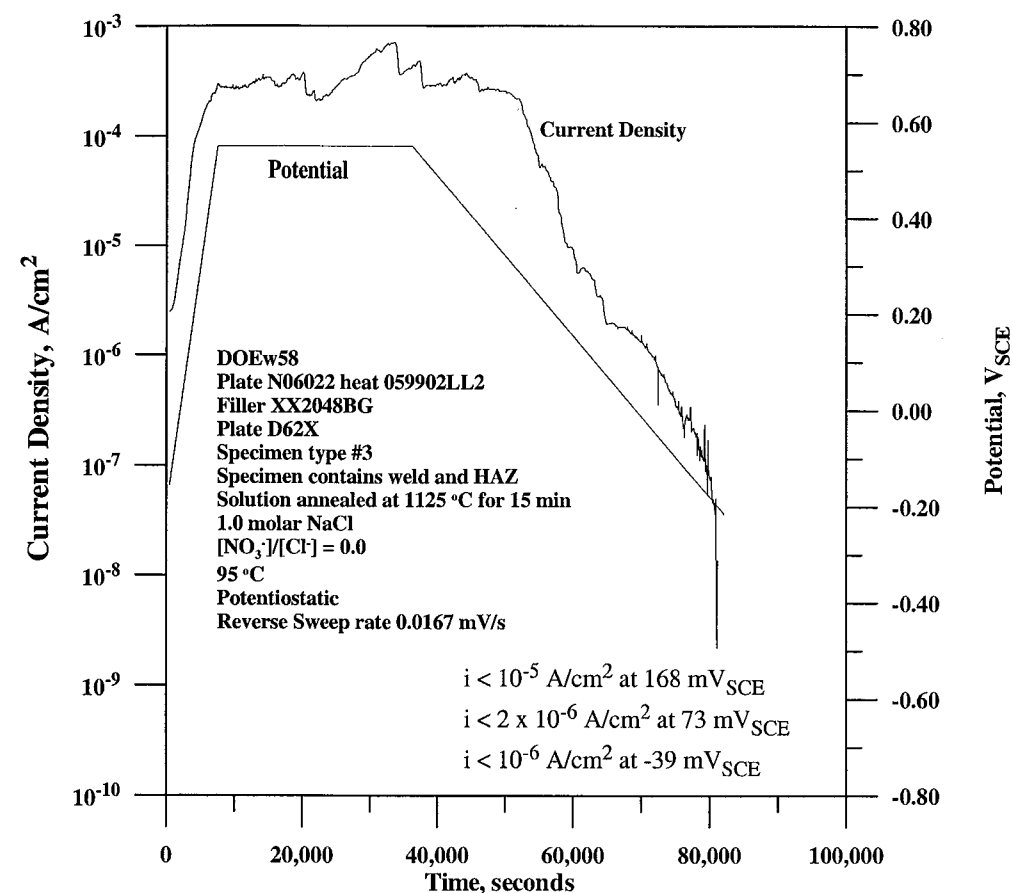
Invented by

Date

Recorded by

2/20/03

From Page No.



Witnessed & Understood by me,

Date

Invented by

Date

Recorded by

2/25/2003

From Page No. _____

Repassivation Potential of Alloy C-22

objective: Same As pg #1

Specimen: DOE Alloy N06022 - Allegheny Ludlum Heat 059902LL2
Inco Alloy 622 heat XX2048BG filler - Specimen Type 3 Row 3 Bottom
Contains weld Material - 600 Grit Finish - with 2 PTFE Crevice
Washers Attached At 50 In-Oz Using Proto #6104 SN#139072
cal 8/28/02 Due 2/28/03 * Note: Specimen Annealed See pg #69 *

Start wt: 34.15541g Sartorius Genius SN#12809099 cal 11/15/02
End wt: 33.91403g Due 5/15/02

Solution: 4.0 m NaCl
467.58g NaCl lot #027878
+ DI water To 2000 ml

pH Start: 8.436 Fisher Accumet 950 meter SN#3340 cal 8/17/02 due 8/17/03
pH End: 7.853 pH probe #13-620-296 SN#2291257 Pb

potentiostat: EG & G Model #273 SN#41108

Counter Electrode: PT Flay

Reference: Fisher 13-620-52 SN#0249092

Temperature: 95°C Hg Thermometer SN#H98-170 cal 5/10/02 due 5/10/03

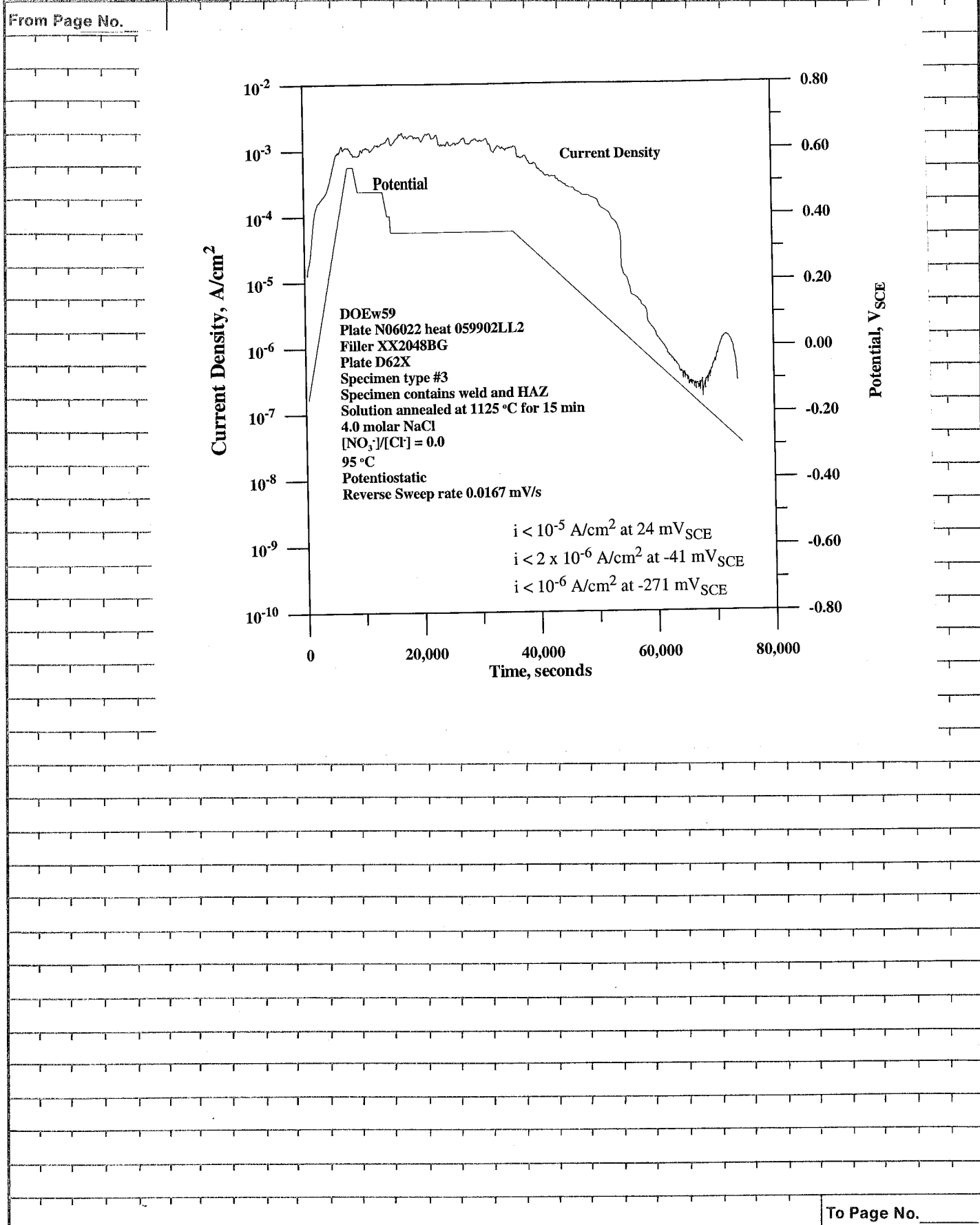
E_{corr}: -341 mV Keithley 614 SN#0704934 cal 5/26/02
E_{pt}: +203 mV Due 5/26/03

Solution Deaerated with 99.999% N₂

Specimen Examination: Crevice Corrosion on 23/24 feet of Crevice washer
staining on All Surfaces of Specimen

Date DOE W59 To Page No. _____

Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	
		<i>[Signature]</i>	2/25/03



Witnessed & Understood by me,	Date	Invented by	Date
		Recorded by	
		<i>[Signature]</i>	2/27/2003

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Continue Testing In Notebook

578

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.

 4/3/03

To Page No. _____

Witnessed & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____
