

Scientific Notebook # 045: Localized
Corrosion Studies on 825, 22, and 316L
(06/03/1992 through 02/14/1997)

IWPE 045

21
300

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IWPE 045

Donald L. Pile DP

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ASTM G5 Test

G5DEP01 - PILE1 disk

Purpose: To conduct a potentiodynamic polarization scan and to verify the accuracy and reproducibility of potentiodynamic measurements.
See CNWRA TOP-009

The test was run in accordance w/ ASTM Designation G5.

Specimen

ASTM supplied Type 430 SS polished to 600 grit

Dimensions: $\phi = \frac{0.360}{\text{DP}} \text{ in}$ 0.357 in } not perfectly cylindrical
 $l = \frac{0.480}{\text{DP}} \text{ in}$ 0.489 in } off by $\leq 0.01 \text{ in}$

Fowler Caliper SwRI No. 20-8C-1

S.A. = 4.18 cm^2 (base + lateral area)

Test solution

Refer to CNWRA TOP-009 § 5.6

1.0 N sulfuric acid

Reagent A.C.S. grade H_2SO_4 Fisher Lot No. 903026

Purged w/ 99.999% pure Argon Liquid Carbonic Cylinder No. RK3110

Potentiostat

Serial No. 62101

EG&G Model 173/276 & Model 342C Software

Reference Electrode: Saturated Calomel Electrode

Time (t_i) before scan (at O.C.P.) = $1\frac{1}{2}$ hr.

$E_{\text{corr}} = -534 \text{ mV vs. SCE}$

$E_{\text{counter electrode}} = -40 \text{ mV and decreasing}$

Keithly 614 Electrometer
SwRI No. 23897

$T_i = 30^\circ\text{C}$

$T_f = 24^\circ\text{C}$

Thermometer No. 1238003

Visual inspection - etched

Checked points on plot w/ ASTM standard plot (G5 Fig. 4A)

→ O.K.

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6/3/92

RUN PARAMETERS

TECHNIQUE	POTENTIODYNAMIC
ORIGINAL NAME	G5DEP01
INITIAL E (MV)	0 VS E
FINAL E (MV)	1600 VS R
SCAN RATE (MV/S)	0.17
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	PASS

SAMPLE PARAMETERS

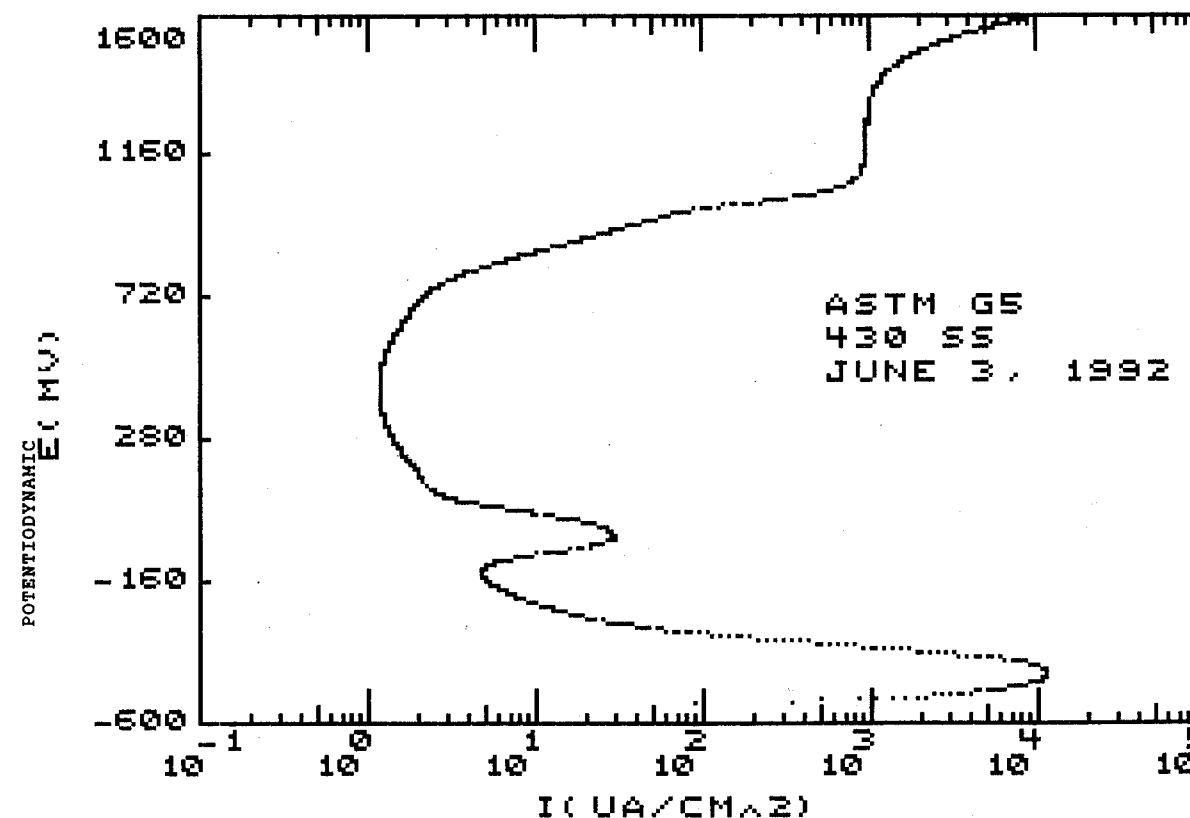
AREA (CM^2)	4.18
EQ WT (GM)	PASS
DENSITY (GM/CM^3)	PASS
CATHODIC TAFEL (MV)	PASS
ANODIC TAFEL (MV)	PASS

DATA SCALE

ECORR	-532
MV/PT	2
DATA MAX	11435.41
DATA MIN	-489.9522
ABS MIN	1.160287
ABS MAX	11435.41

LEGEND

ASTM DESIGNATION G5 TEST
BEFORE
06/03/92
ECORR TO 1600 V. SCE
0.17 MV/S
30C
TYPE 430 SS
1.0N H2SO4 (AR PURGE)



Donald L. Pile
6/3/92

Depassivation Experiments

IWPE Task 1

Test purpose: To investigate the conditions under which the passive film can be destabilized.

Test solution 01

4M Cl^- soln 56.67 ppm HCO_3^-

Prepared according to TOP-010

701.28g NaCl Mettler PM 4600 Delta Range Serial No.

Fisher Lot No. 885407

0.42128g NaHCO_3 Sartorius MCL SWRI No. 25365

Fisher Lot No. 897789

added to 3.0L Nanopure H_2O

pH = 7.457

Orion Model 720A SWRI No. 24670

calibration 99.2%

pH 1.00 Fisher Lot No. 913288-18

pH 7.00 " 913828-24

pH 10.00 " 913908-24

Donald Z. Pile

6/3/92

Test 001 DEPO01 - PILE1 disk

Specimen DEPO01

AISI 304L SS Heat T0954 polished to 600 grit (TOP-003)

Dimensions: $\phi = 0.250$ in

$l = 0.749$ in

Fowler Caliper SWRI No. 20-8C-1

S.A. = 2.21 cm^2 being submerged $\frac{1}{2}$ way in (approximately by visual inspection). Immersed area verified at the end of test and recorded.

DP 6/4/92

Potentiostat

Serial No. 62101

EG&G Model 173/276 & Model 342C Software.

Reference Electrode: Saturated Calomel Electrode

Time @ O.C.P. 1 hr.

Purged w/ 99.999% pure Argon Liquid Carbonic Cylinder No. RK311

$E_{\text{corr}} = -728 \text{ mV vs. SCE}$ } Keithley 614 Electrometer

$E_{\text{CE}} = -149 \text{ mV vs. SCE}$ } SWRI No. 23897

$T_i = 95^\circ\text{C}$ Thermometer No. 1238003

Scan

Rate = 0.17 mV/s

@ start of computer scan E_{corr} began @ -388 mV vs. SCE

Data pt. from computer
file -392 mV vs. SCE

STOPPED experiment about $1\frac{1}{2}$ hr. into scan due to current overload on potentiostat.

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6/4/92

Specimen (DEPO01)

Immersion distance checked: 0.259 in uncorroded

$\Rightarrow 0.490$ in immersed

\therefore immersed S.A. = 2.80 cm^2

Severely corroded, turned dark in color

General corrosion w/ some form of iron oxide.

Solution: after, green precipitates settled to bottom filtered w/ Whatman paper

@ 21.6°C 9.980 pH

Orion Model 720A SWRI No. 24670

calibration 100.9%

pH 10.00 ($22.0^\circ\text{C} \rightarrow 10.04 \text{ pH}$) Fisher Lot No. 913908-24

pH 7.00 ($21.8^\circ\text{C} \rightarrow 7.02 \text{ pH}$) " 913828-24

DP 6/5/92

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	DEP001
INITIAL E(MV)	0 VS E
VERTEX E(MV)	1200 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM ²)	100000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	PASS

SAMPLE PARAMETERS

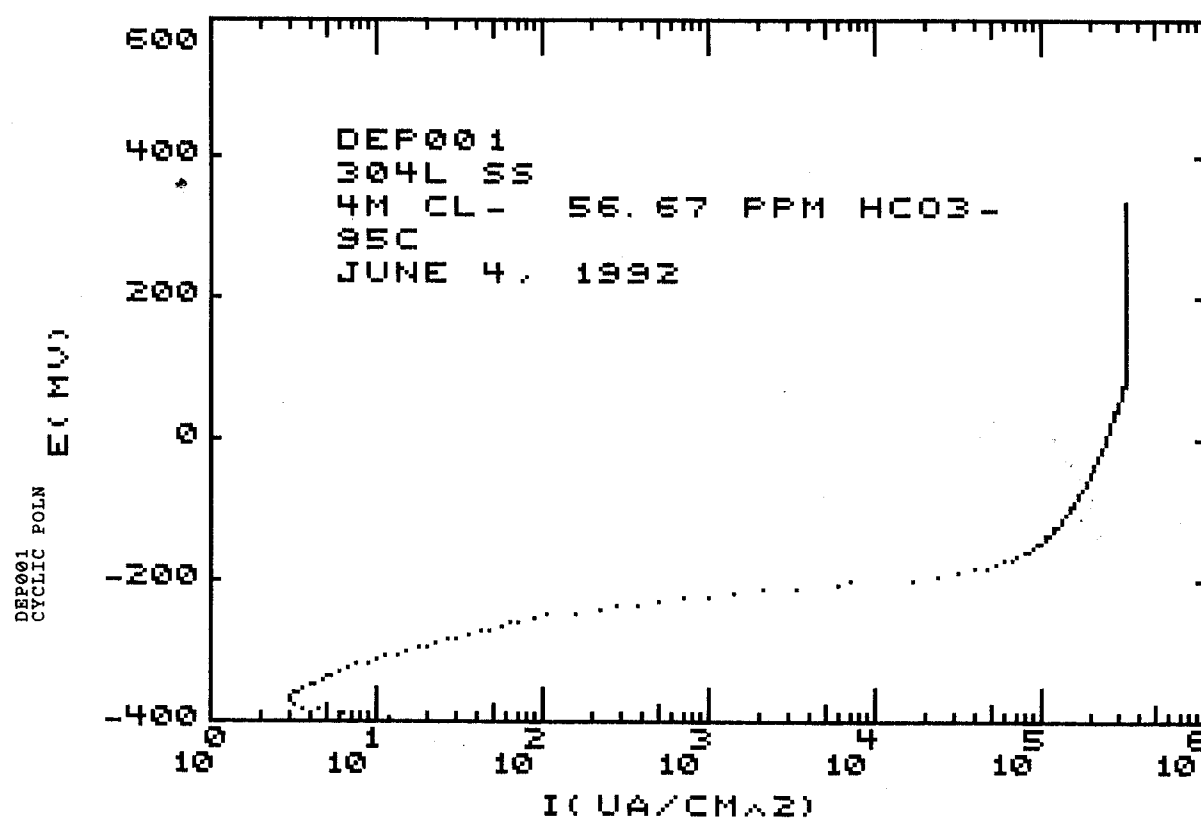
AREA(CMS ²)	2.84
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-392
MV/PT	4
DATA MAX	340140.8
DATA MIN	-7211.268
ABS MIN	2.943662
ABS MAX	340140.8

LEGEND

DEP001 06/04/92
ECORR TO 1200 V SCE TO ECORR
0.17MV/S
95C
AISI 304L SS
4M CL- 56.67 PPM HCO₃-
AR PURGE



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6/5/92

Test 002 DEP002 - FILE 1 disk

Specimen DEP002

AISI 304L SS Heat T0954 polished to 600grit (TOP -003)

Dimensions: $\phi = 0.250$ in

$l = 0.750$ in

Fowler Caliper SWRI No. 20-8C-1

S.A. = 2.85 cm² being submersed $\frac{2}{3}$ way into soln.
by visual inspection. Actual immersed area
verified & recorded @ end of test.

Test soln & potentiostat: same as test 001 (see p.6 & p.7 respectively)

Test Ar purge for 1 hr.

Time @ O.C.P. 1 hr.

$E_{corr} = -665$ mV vs. SCE } Keithley 614 Electrometer
 $E_{c.e.} = -103$ mV vs. SCE } SWRI No. 23897

$T_b = 30$ C Thermometer No. 1238003

Scan Rate = 0.17 mV/s

@ start of computer scan E_{corr} changed to -108 mV } Keithley
 $E_{c.e.}$ " -344 mV }

Again current overload (~1Amp) occurred necessitating
stopping experiment. Data saved. (DEP002)

Specimen after

0.205 in uncorroded length

\Rightarrow 0.545 in immersed length

S.A. actual = 3.08 cm²

Severely pitted

Soln. after green ppt. filtered w/ Whatman paper

@ 26.0 C 10.247 pH

Orion Model 720 A SWRI No. 24670

calibration 100.9%

pH 10.00

Fisher Lot No. 913908-24

pH 7.00

" 913828-24

Donald L. Pike 6/5/92

Test 003 DEP003 - FILE1 disk

Specimen (DEP003)

AISI 316 L SS Ht. P80746 polished to 600 grit (TOP-003)

Dimensions: $\phi = 0.249$ in } Fowler Caliper
 $l = 0.749$ in } SwRI No. 20-80-1

by visual inspection, immersed $\frac{2}{3}$ way into soln.; verified after
 \Rightarrow S.A. ≈ 2.83 cm²

Test soln. & potentiostat same as Test 001 (see p.6 & p.7 respectively)

Test Ar purge for 1 hr

Spec. at O.C.P 1 hr.

$E_{corr} = -682$ mV v. SCE } Keithley 614 Electrometer
 $E_{CE} = -99$ mV v. SCE } SwRI No. 23397

$T_i = 30^\circ\text{C}$ Thermometer No. 1238003

Scan Rate = 0.17 mV/s

at start of computer controlled scan potentials changed

$E_{corr} = -127$ mV v. SCE

$E_{CE} = -400$ mV v. SCE and increasing slowly } Keithley

Also seen on plotter (for W.E. potential (V)) ABB 120 SE (I.D. No. 0915265)

Again, a current overload occurred, necessitating turning off cell from potentiostat. Data saved as DEP003

$T_f = 35^\circ\text{C}$

Specimen inspection

0.224 in uncorroded length \Rightarrow .525 in immersed length
 \therefore S.A. actual = 2.96 cm²

Severely pitted

Soln. post test

small green precipitates

filtered w/ Fisher Brand filter paper for pH test

pH = 9.835 (21.4°C)

Orion Model 720A SwRI No. 24670

calibrated w/ (103% slope) pH 10.00 Fisher Lot No. 913908-24

pH 7.00 " 913828-24

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RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	DEP002
INITIAL E(MV)	0 VS E
VERTEX E(MV)	1200 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM^2)	100000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	PASS

SAMPLE PARAMETERS

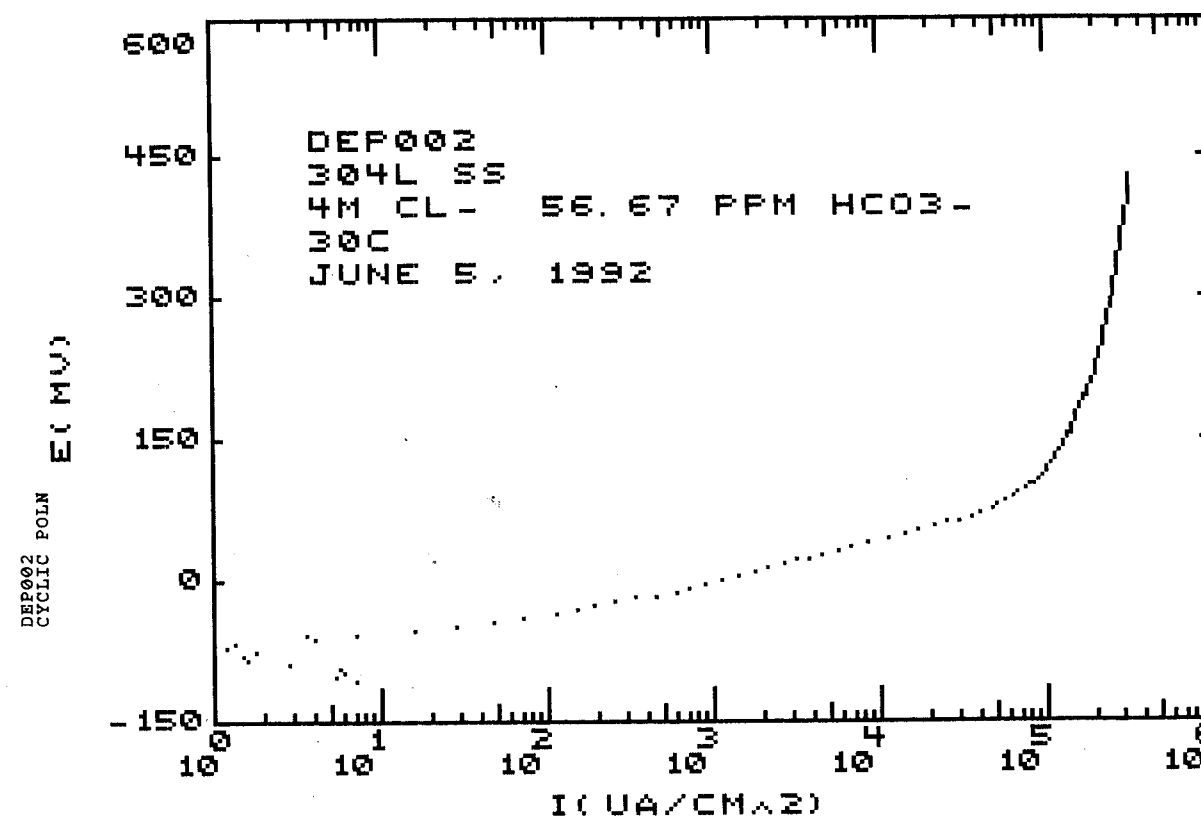
AREA(CMS^2)	2.85
EQ WT(GM)	PASS
DENSITY(GM/CM^3)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-107
MV/PT	4
DATA MAX	337894.8
DATA MIN	-71.85965
ABS MIN	1.2
ABS MAX	337894.8

LEGEND

DEP002 06/05/92
 ECORR TO 1200 V SCE TO ECORR
 0.17MV/S 30C
 AISI 304L SS
 4M CL- 56.67 PPM HCO3-
 AR PURGE



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RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM^2)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP003
0 VS E
1200 VS R
0 VS E
.17
100000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS^2)
EQ WT(GM)
DENSITY(GM/CM^3)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.83
PASS
PASS
PASS
PASS

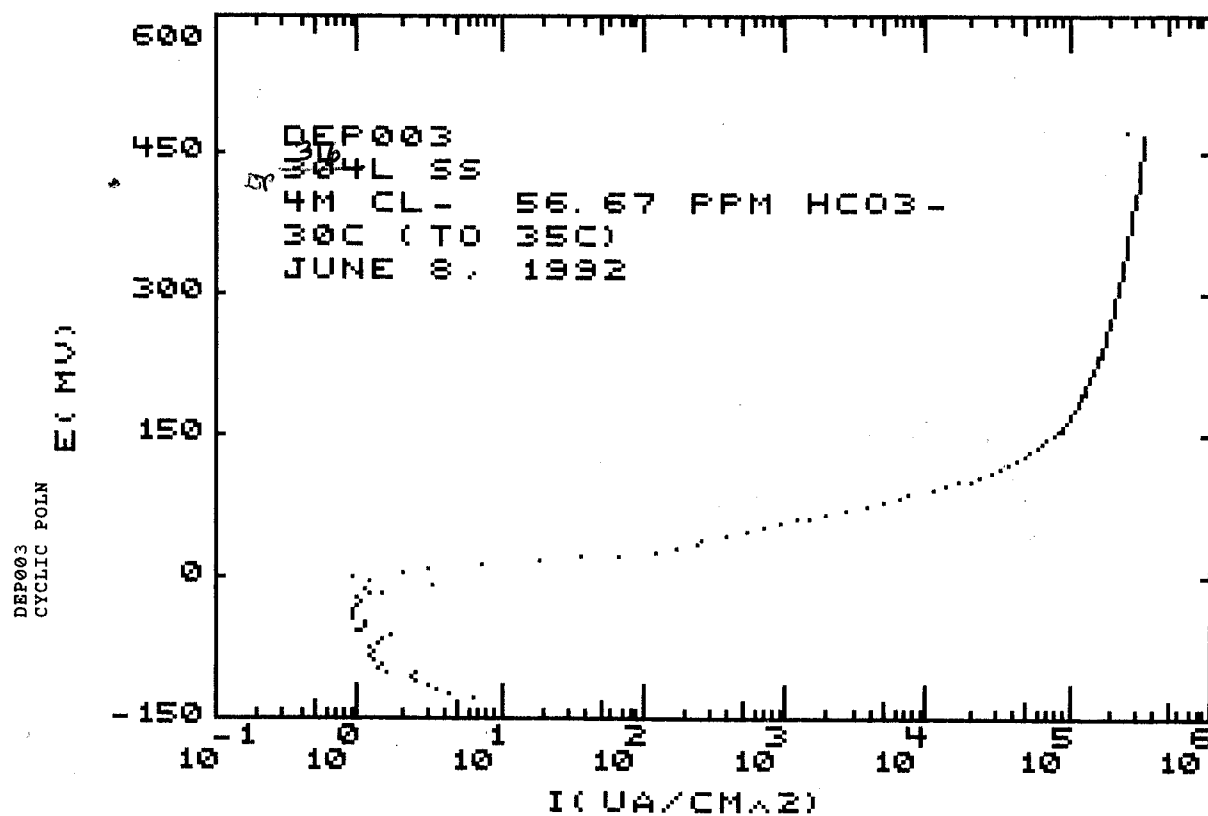
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

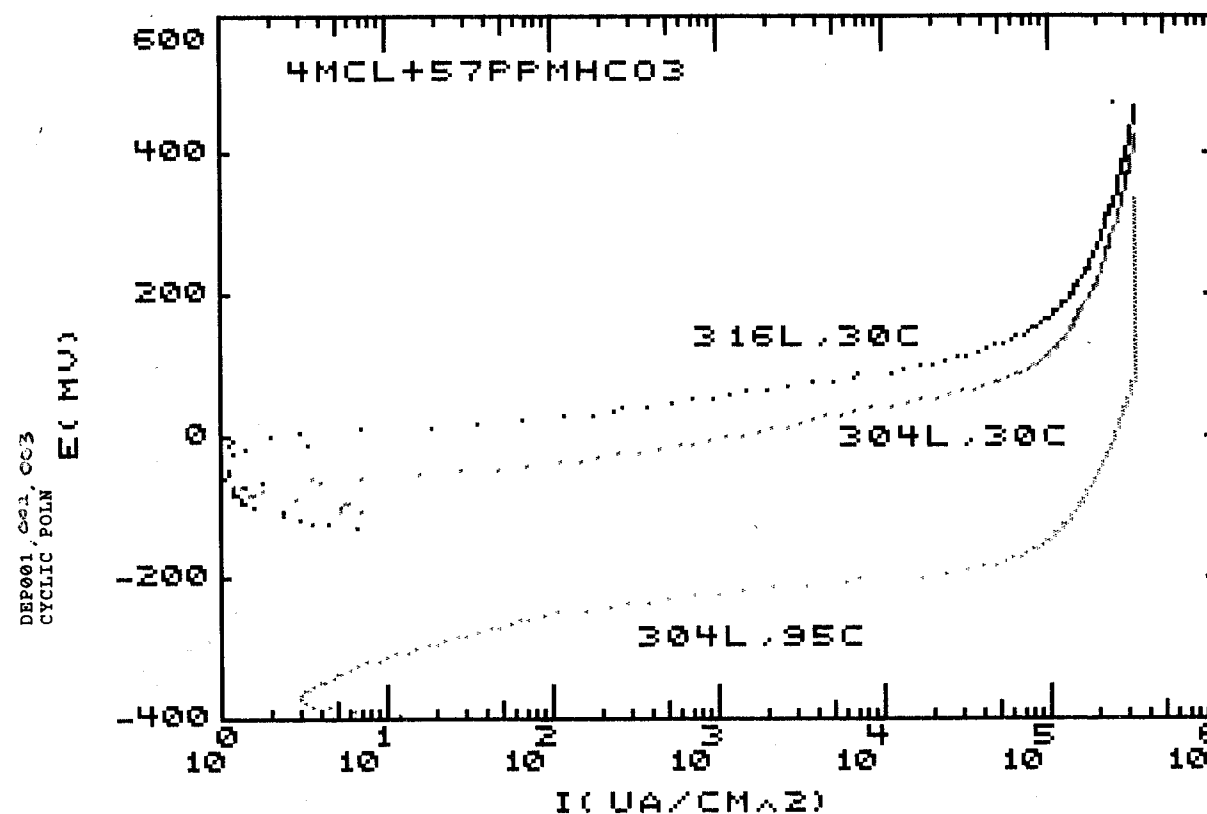
-127
4
339222.6
-7236.75
.8975265
339222.6

LEGEND

DEP003 06/08/92
ECORR TO 1200 V SCE TO ECORR
0.17MV/S 30C
AISI 316L SS
4M CL- 56.67 PPM HCO3-
AR PURGE



Donald L. Pile 6/8/92



Donald L. Pile
6/8/92

Test 004 DEP004 - PILE1 disk

Specimen (DEP004)

Hastelloy C-22 Ht. 3175

$l = 0.750$ in } Fowler Caliper

$\phi = 0.249$ in } SwRI No. 20-8C-1

Immersed $\frac{2}{3}$ (by visual inspection) way into soln.

Estimated S.A. = 2.84 cm^2

Actual S.A. measured afterwards

Test Soln. \pm Potentiostat same as Test 001 (see p.6 & p.7 respectively)

Test Ar purge for 1 hr.

Specimen (immersed) at OCP for 1 hr.

Before scan $E_{\text{corr}} = -578.2 \text{ mV vs. SCE}$ } Keithley 614 Electrometer

$E_{\text{GE}} = -118.2 \text{ mV vs. SCE}$ } SwRI No. 23897

$T_i = 30^\circ\text{C}$ Thermometer No. 1238003

Scan rate = 0.17 mV/s

Potentials jumped again at beginning of scan

to $E_{\text{corr}} \sim -108 \text{ mV vs. SCE}$

$E_{\text{GE}} \sim -290 \text{ mV vs. SCE}$ } Keithley

from plotted values ABB 120 SE

$28^\circ\text{C} < T < 35^\circ\text{C}$

Test stopped above the vertex

Specimen inspection

0.227 in uncorroded length $\Rightarrow 0.523$ in immersed length

\therefore Actual S.A. = 2.95 cm^2

Surface etched

Soln. post test

soln. has yellow color

filtered w/ Whatman filterpaper

pH = 7.887 (21.7°C)

Orion Model 720A SwRI No. 24670

Calibrated to 102.7% pH 10.0 Fisher Lot No. 913808-24

pH 7.0 " 913828-24

6/9/92

RUN PARAMETERS

TECHNIQUE	DEP004
ORIGINAL NAME	DEP004
INITIAL E(MV)	0 VS E
VERTEX E(MV)	1200 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM^2)	100000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	PASS

SAMPLE PARAMETERS

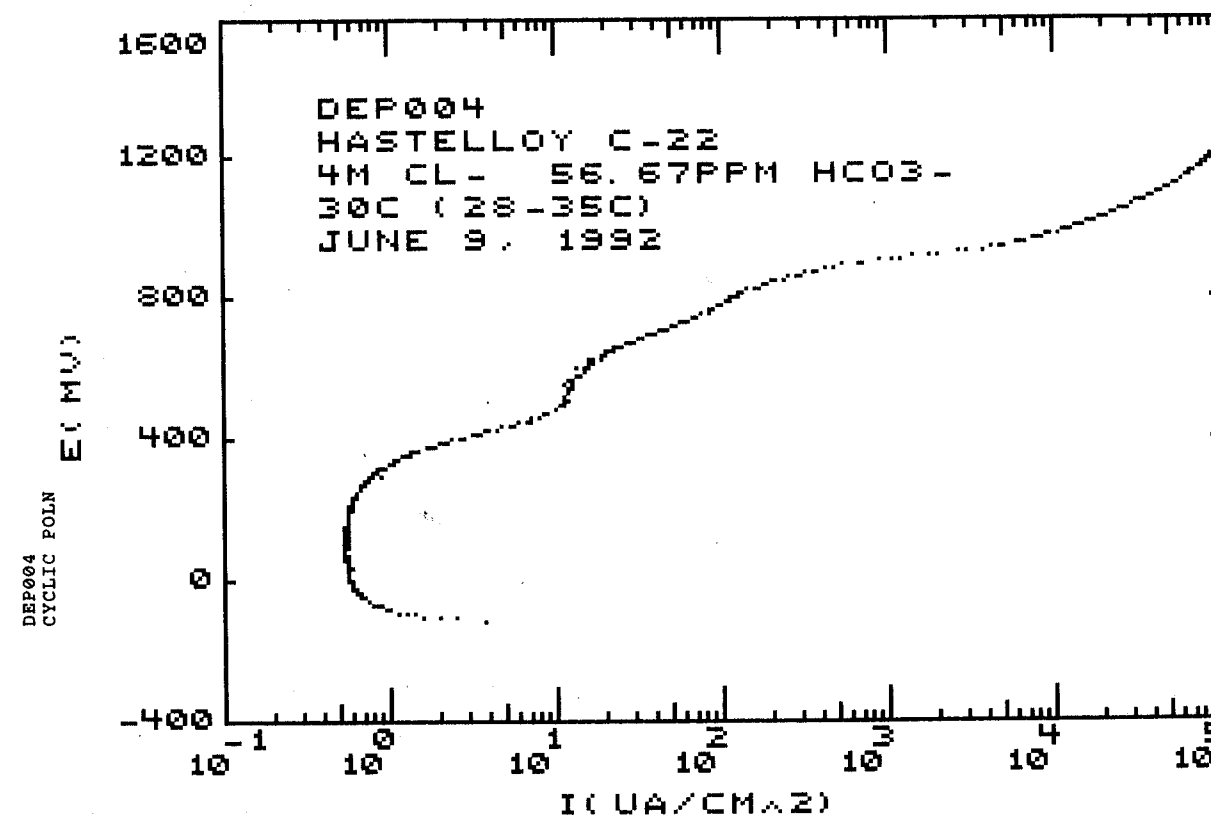
AREA(CMS^2)	2.84
EQ WT(GM)	PASS
DENSITY(GM/CM^3)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-113
MV/PT	4
DATA MAX	99647.89
DATA MIN	.5352113
ABS MIN	.5352113
ABS MAX	99647.89

LEGEND

DEP004 06/09/92
ECORR TO 1200 V SCE TO ECORR
0.17MV/S 30C
HASTELLOY C-22
4M CL- 56.67PPM HCO3-
AR PURGE



Donald L. Pike
6/9/92

Trial Runs to determine source of current overload & jumps in potentials on the electrodes at the beginning of the tests.

A trial run was set up using a specimen and soln. having known results (from previous experiments.)

The same jumps in potentials occurred, thus indicating the source being the potentiostat. It was discovered that the Cell Override button had been inadvertently activated and was causing an unknown resistance to be applied to the cell.

The current overload may be due to the cell conditions and will be determined by the upcoming tests.

Donald L. Pile
6/9/92

Depassivation Experiments
(IWPE Task 1)

Purpose ; see p. 6

⁰²
Test Soln. ~~0.1M~~

4M Cl^- + 85 ppm HCO_3^-

Prepared according to TOP-010

701.3 g NaCl Fisher Lot No. 885407 } Mettler PM 4600 Delta Range
Ser. No. I 20461

0.63194 g NaHCO_3 Fisher Lot No. 897789 } Sartorius MC1
Ser. No. 10704379
~~Ser. No. 25365 DP~~

added to Nanopure Water (17 MJL) to make 3.0L soln.

Orion Model 720A pH meter Ser. No. 003368

slope 99.3%

Buffer Soln pH 10.00 Fisher Lot No. 913908-24, 23.1C/10.03pH

" pH 7.00 " 913828-24, 22.8C/7.01pH

soln. pH = 7.374

Donald L. Pile
6/10/92

Note: Any corrections before this point which are not dated were corrected on or before June 10, 1992.

DP 6/10/92

Instruments Used for Tests

pH meter: Orion model 720A Serial No. 003368

Analytical balance: Sartorius MC1 Model RC 210 P Serial No. 10704379

Topload balance: Mettler PM 4600 Delta Range Serial No. J20461

Caliper: Fowler Serial No. G926829 SWRI No. 20-8C-1 (in In.)

Micrometer: SWRI No. 20-M-1 (in Cm)

Thermometer: Fisher Brand
SWRI No. 1238003 (A) for 30C
SWRI No. 1253001 (B) for 95CPotentiostat: EG & G Princeton Applied Research Model 173 Serial No. 62101
Softcorr Model 342

Electrometer: Keithley 614 Serial No. 467374

Donald Pile 6/11/92

Test 005 DEPO05- PILE1 diskSpecimen: DEPO05

AISI 304L SS Ht. T0954

 $l = 0.749$ in } (Fowler)
 $\phi = 0.250$ inImmersed by visual inspection $\frac{2}{3}$ length into soln.Estimated S.A. = 2.84 cm^2

Actual S.A. measured afterwards

Soln.: Test Soln. 02, see p. 17Test: Ar purge $1\frac{1}{2}$ hr. Liquid Carbonic Cylinder # RK3110

Specimen at O.C.P. for 1 hr.

Before scan $E_{\text{corr}} = -488.2 \text{ mV vs. SCE}$ } (Keithley) $E_{\text{CE}} = -375.5 \text{ mV vs. SCE}$ $T_i = 30 \text{ C}$ } 1238003 (A)Scan rate = 0.17 mV/s $28 \text{ C} < T < 33 \text{ C}$ Post test:Specimen: 0.288 in unimmersed lengthActual S.A. = 2.65 cm^2

Spec. pitted

Soln.: green precipitates

Filtered w/ Whatman filter paper for pH test

Buffer Soln. pH 10.00 (23.1C/10.03pH) Fisher Lot No. 913908-24

" 7.00 (22.8C/7.01pH) " 913828-24

99.3% slope } (Orion)
9.271 pH (23.4C)

DP 6/11/92

Test 005

Parameters & Plot

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION I(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP005
0 VS E
100 VS R
0 VS E
.17
100000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.84
PASS
PASS
PASS
PASS

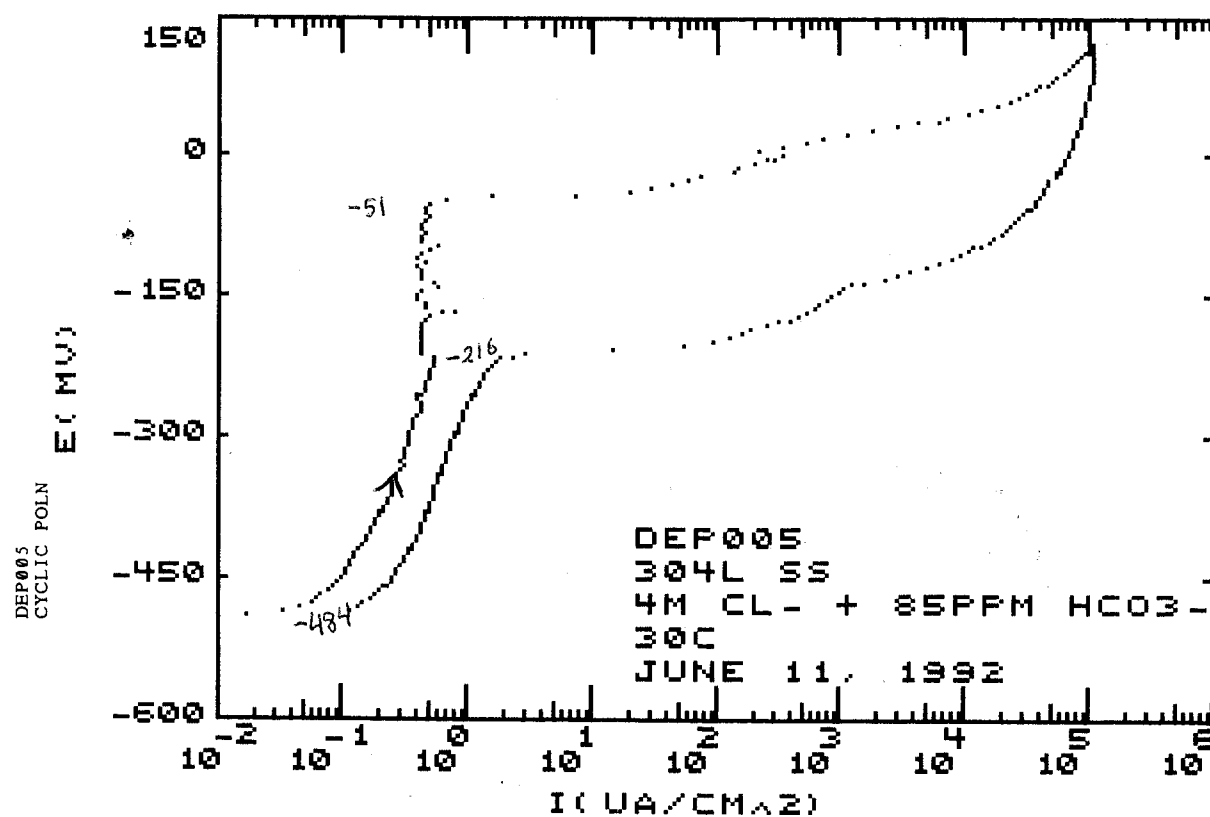
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-488
4
111619.7
-7211.268
.0163493
111619.7

LEGEND

DEP005 06/11/92
AISI 304L SS
HT T0954
4M CL- + 85PPM HCO₃-
AR PURGE
30C



Donald L. Rie
6/11/92

Test 006 DEP006 - PILE 1 disk

Specimen: DEP006

AISI 304L SS HT. T0954

$l = 0.750$ in

$\phi = 0.249$ in

Immersed by visual inspection $\frac{3}{4}$ length into soln.

Estimated S.A. = 3.15 cm^2

Actual S.A. measured afterwards

Soln.: Test Soln. 02, see p. 17

Test: Ar purge 2 hr. Liquid Carbonic Cylinder # RK3110

Specimen at O.C.P. for 1 hr.

$90 < T < 95$ (B)

Before scan $E_{\text{corr}} = -670 \text{ mV vs. SCE}$

$E_{\text{c.e.}} = -47 \text{ mV vs. SCE}$

$T_i = 93 \text{ C}$

Scan Rate = 0.17 mV/s

$93 < T < 95 \text{ C}$

Current overload occurred; aborted at that time

Post test:

Specimen: 0.156 in unimmersed length

Actual S.A. = 3.31 cm^2

Spec. pitted

Soln.: green precipitate

filtered w/ Whatman filter paper for pH test

Buffer soln. pH 10.00 (10.02/23.6C) Fisher Lot No. 913908-24

" 7.00 (7.01/23.7C) " 913828-24

103% slope

9.326 pH (23.5C)

Test will be redone as 006 R w/ the Vertex potential set lower ($\sim -100 \text{ vs. SCE}$) so as to have a reverse scan.

ASP 6/12/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP006
0 VS E
100 VS R
0 VS E
.17
100000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

3.15
PASS
PASS
PASS
PASS

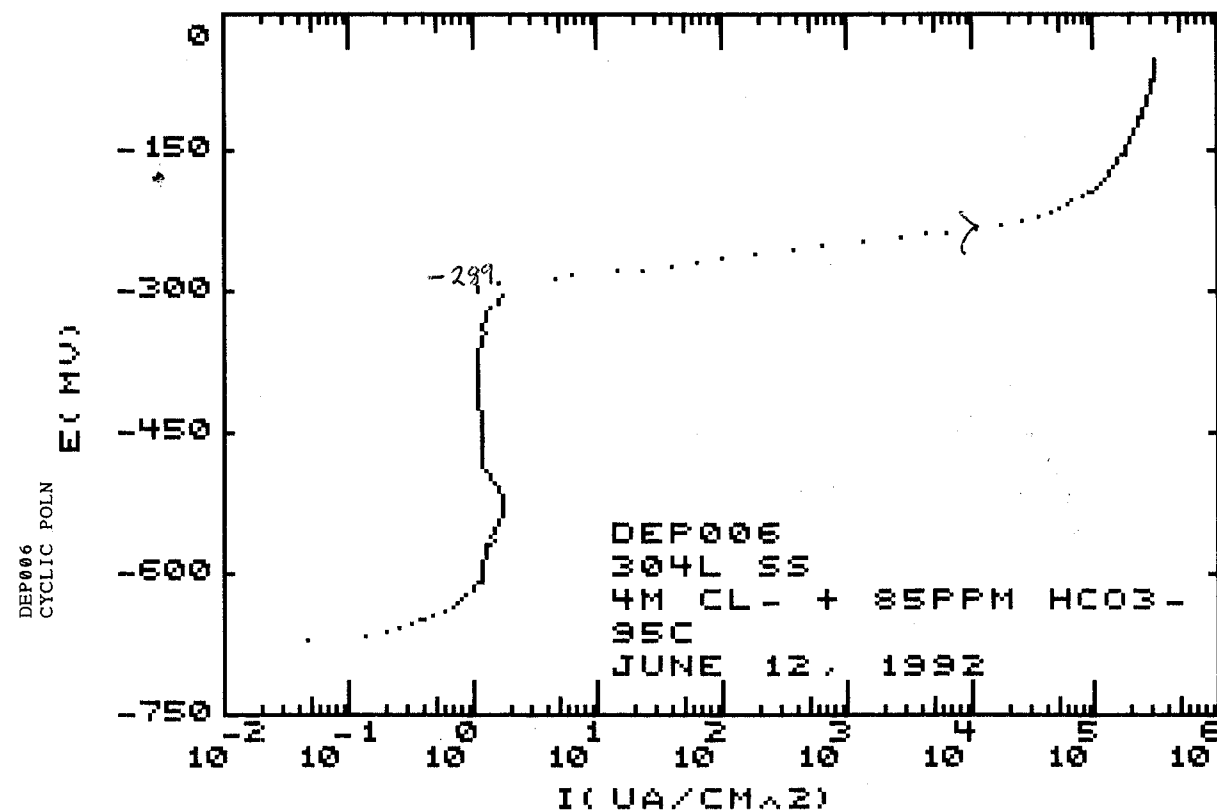
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-670
4
315238.1
-65015.87
4.761904E-02
315238.1

LEGEND

DEP006 06/12/92
AISI 304L SS
HT T0954
4M CL- + 85PPM HCO₃-
AR PURGE
95C



Donald L. Pile
6/12/92

Test 006R DEP006R - PILE 1 disk

Specimen: DEP006R

AISI 304L SS HT T0954

$l = 0.749$ in

$\phi = 0.249$ in

Immersed by visual inspection $\frac{2}{3}$ length into soln.

Estimated S.A. = 2.83 cm^2

Actual S.A. measured afterwards

Soln: Test soln. 02, see p. 17

Test: Ar purge ~~2 hr~~^{6/15/92} 1 hr. Liquid Carbonic Cylinder # RK3110

Specimen at O.C.P. for 1 hr.

Before scan $E_{\text{corr}} = -747 \text{ mV vs. SCE}$

$E_{\text{c.e.}} = -170 \text{ mV vs. SCE}$

$T_i = 95^\circ\text{C}$

Scan rate = 0.17 mV/s

$94 < T < 95^\circ\text{C}$

Successful

Post test:

Spec: 0.297 in unimmersed length

Actual S.A. = 2.59 cm^2

Spec. pitted

Soln: Small amount of green precipitate

filtered w/ Whatman filter paper for pH test

Buffer soln. pH 10.00 Fisher Lot No. 913908-24 ($4.0/23.8^\circ\text{C}$)
^{10.02}
~~6/15/92~~

" 7.00 " 913828-24 ($7.01/23.8^\circ\text{C}$)

" 4.00 " 910359-24 ($4.0/23.7^\circ\text{C}$)

101.6 % slope

8.902 pH (@ 24.0°C)

DP 6/15/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP006R
0 VS E
-100 VS R
0 VS E
17
100000
PASS
PASS
PASS

Test 006R

Parameters & Plot

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.83
PASS
PASS
PASS
PASS

DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-745
4
136395.8
-723.6749
7.067138E-03
136395.8

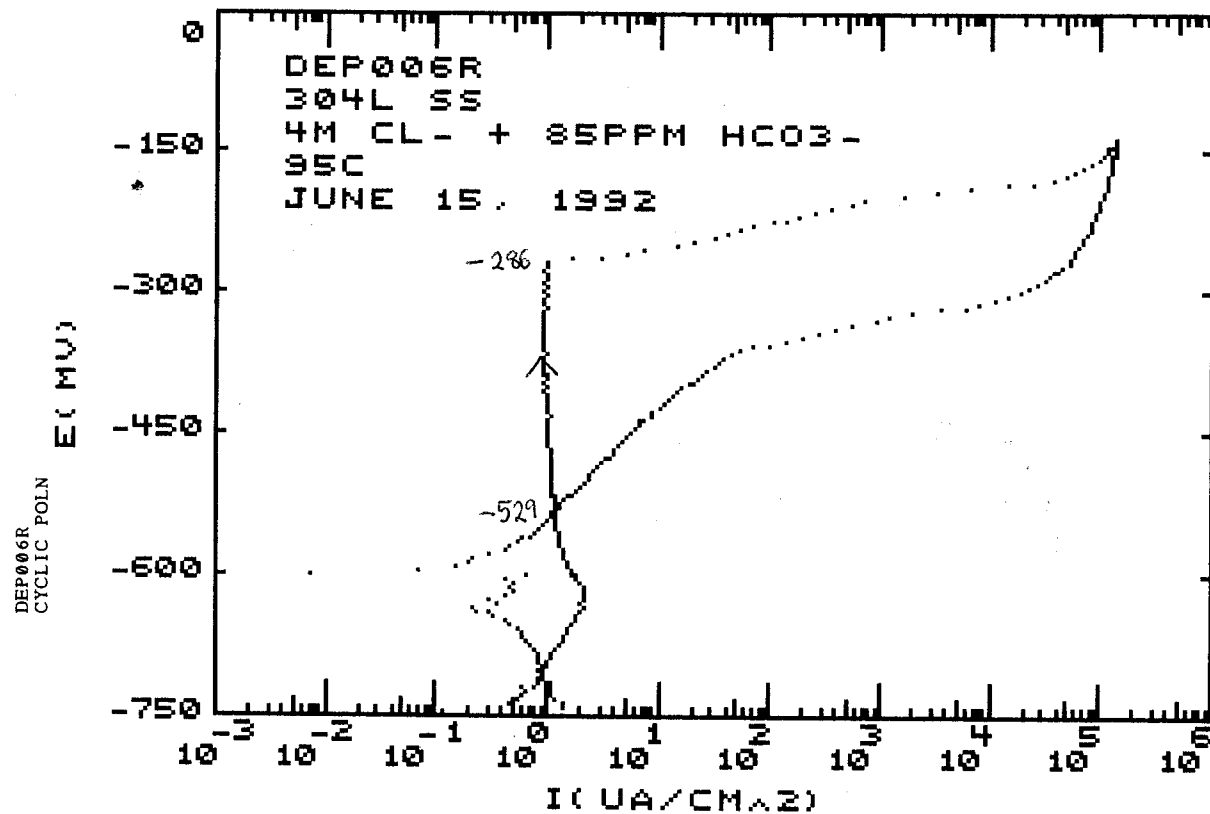
RESULTS

E(I=0)(MV)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)
I-CORR(UA/CM²)
CORR RATE(MPY)
E(I=0)(MV)
POL RES.(K-OHMS CM²)
I-CORR(UA/CM²)
CORR RATE(MPY)

-265.83
967.37
25.09
.9399294
UNKNOWN
-256.84
.2477
87.63

LEGEND

DEP006R 06/15/92
AISI 304L SS
HT T0954
4M CL- + 85PPM HCO3-
AR PURGE
95C



Donald L. Pile
6/15/92

Test 007 DEP007 - PILE1 disk

Specimen: DEP007

AISI 316L SS Ht. P80746

 $l = 0.752$ in

Small mechanical defect smoothed out.

 $\phi = 0.242$ inImmersed by visual inspection $3/4$ length into soln.Estimated S.A. = 3.06 cm^2

Actual S.A. measured after test.

Soln.: Test soln. 02, see p.17

Test: Ar purge 1 hr. Liquid Carbonic Cylinder # RK 3110

Specimen at O.C.P for 3 hrs. $29 < T < 40^\circ\text{C}$ Before scan $E_{\text{corr}} = -686 \text{ mV vs. SCE}$ $E_{\text{c.e.}} = 37 \text{ mV vs. SCE}$ $T_i = 31^\circ\text{C}$ Scan rate = 0.17 mV/s $26 < T < 31^\circ\text{C}$

Donald L. Pile

6/16/92

Post test:

Spec.: 0.590 in immersed lengthActual S.A. = 3.19 cm^2

Spec. pitted.

Soln. dark green precipitate

filtered w/ Whatman filter paper for pH test

Buffer soln. pH 10.00 Fisher Lot No. 913908-24

" 7.00 " 913828-24

105% slope

 9.288 pH (23.4C)

Donald L. Pile

6/17/92

Test 007

Parameters & Plot

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP007
0 VS E
50 VS R
0 VS E
.17
100000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

3.06
PASS
PASS
PASS
PASS

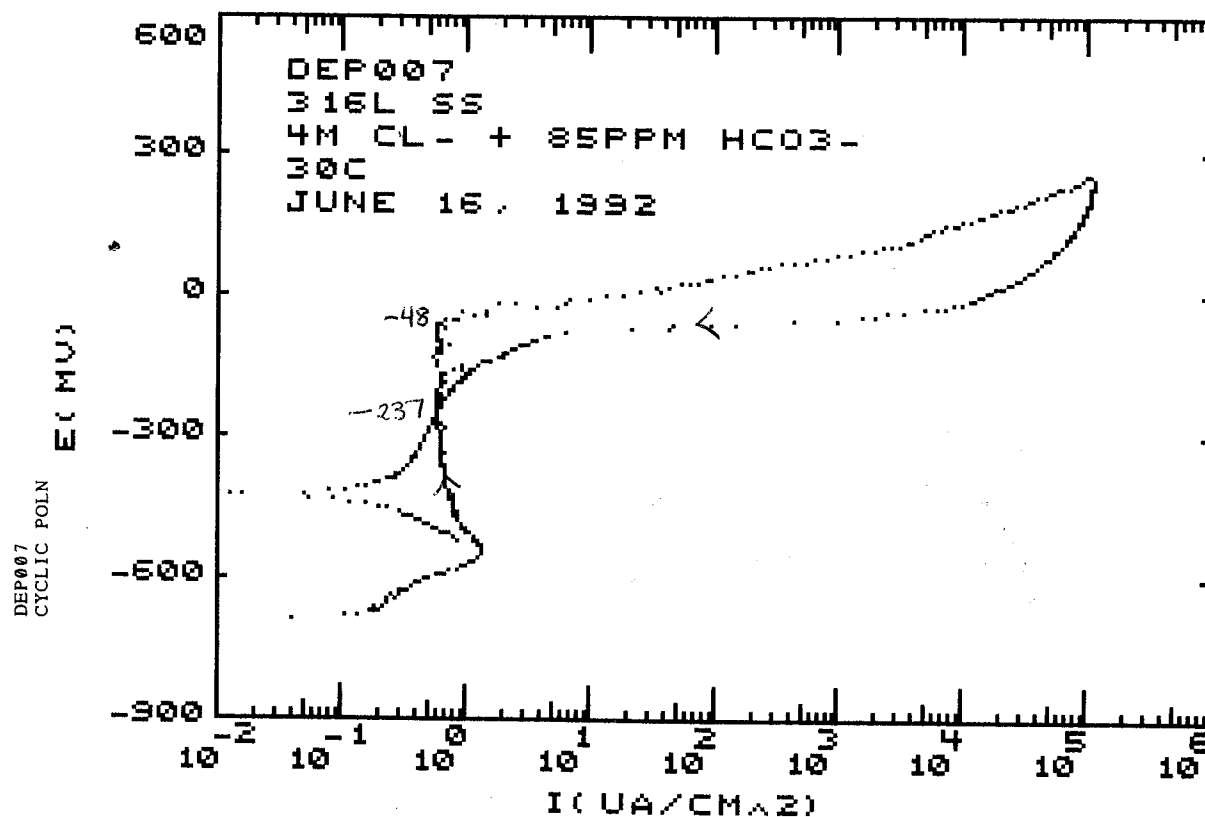
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-685
4
113398.7
-8660131
0.0130719
113398.7

LEGEND

DEP007 06/16/92
AISI 316L SS
HT P80746
4M CL- + 85PPM HCO₃-
AR PURGE
30C



Donald L. Pile
6/16/92

Test 008 DEP008 - PILE1 disk

Spec.: DEP008

AISI 316L SS HT. P80746

 $l = 0.749 \text{ in.}$ $\phi = 0.248 \text{ in.}$ Immersed by inspection $\frac{2}{3}$ length into soln.Estimated S.A. = 2.82 cm^2

Actual S.A. measured after test.

Soln: Test Soln. 02, SPE p.17

Test: Ar purge for 1hr. Liquid Carbonic Cylinder # R91b

Specimen at O.C.P. for ~1hr.

Before Scan $E_{\text{corr}} = -702 \text{ mV vs. SCE}$ $E_{\text{c.e.}} = -151 \text{ mV vs. SCE}$ $T_i = 94^\circ\text{C}$ Scan rate = 0.17 mV/s ~~$29 < T < 31^\circ\text{C}$~~ $94 < T < 96^\circ\text{C}$

Post test:

Spec. Pitted on one side (in general) and not ~~to~~ $\frac{2}{3}$ the other.Measured to longest, noticeable film mark left on surface through test ~~sp 6/17/92~~ about half length instead of expected $\frac{2}{3}$."Immersed" length = 0.392 in. "Actual" S.A. = 2.28 cm^2

Soln. Yellowish color to soln. w/ dirty light green precipitate

filtered w/ Whatman filter paper for pH test

Buffer soln. 10.00 Fisher Lot No. 913908-24

" 7.00 " 913828-24

105% slope

8.790 pH (24.7C)

Donald L. Pile
6/17/92

Test 008

Parameters & Plot

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION I(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP008
0 VS E
-200 VS R
0 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.82
PASS
PASS
PASS
PASS

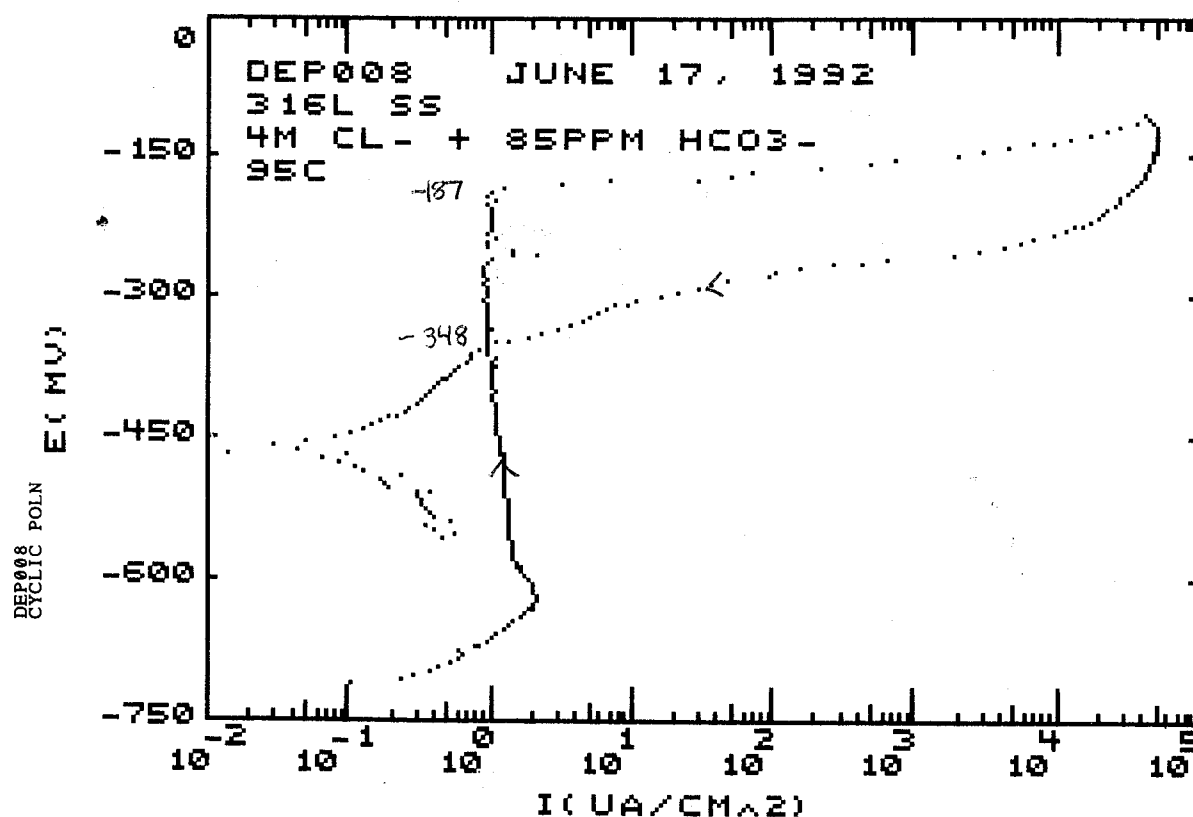
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-708
4
51879.43
-726.2411
.0141844
51879.43

LEGEND

DEP008 06/17/92
AISI 316L SS
HT P80746
4M CL- + 85PPM HCO₃-
AR PURGE
95C



Donald L. Pile
6/17/92

~~Test 009~~ DP 6/18/92

Test Soln. 03A

4M CL- ~ 3 pH

pH Buffer soln. pH 7.00 Fisher Lot No. 913828-24 (7.02 pH / 21.2 C)

" 4.00 " 910359-24 (4.00 pH / 21.3 C)

" 1.00 " 913288-18 (1.00 pH / 21.3 C)

94.5 % slope

(1.00 / 21.2 C)

(7.02 / 21.2 C)

(4.00 / 21.2 C)

96.1 % slope

233.76g NaCl Fisher Lot No. 885407

50061842 Mettler

I added 10 ml N/10 HCl¹ to NaCl + H₂O (Nanopure) soln. and
fill to mark on 1L vol. flask, then checked pH (~ 2.2)

To raise pH to 3 I added slowly N/10 NaOH² while stirring
and measuring pH (~ 3.5 ml)
pH 3.007 for final soln.

① - Stock soln. made from following:

1.65 ml Conc. HCl Fisher Lot No. 920004

added to Nanopure water to make 200 ml soln.

1.004 pH (calibration on p. 34)

② - Fisher Lot No. 883432-24

Donald L. Pile
6/18/92

Test 009 DEP009 - PILE1 disk

Spec. DEP009

AISI 304L SS Ht. T0954

$l = 0.750$ in

$\phi = 0.250$ in

Immersed by visual inspection $\frac{2}{3}$ length into soln.

Estimated S.A. = 2.84 cm^2

Actual S.A. measured after test

Soln. Test soln. 03A, see p. 29

Test Ar purge for ~ 1 hr. Liquid Carbonic Cylinder # RK3110

Specimen at O.C.P. for ~ 1 hr. $91 < T < 96$

Before scan $E_{\text{corr}} = -406 \text{ mV vs. SCE}$

$E_{\text{c.e.}} = 108 \text{ mV vs. SCE}$

$T_i = 95^\circ\text{C}$

Scan rate = 0.17 mV/s

$94 < T < 96^\circ\text{C}$

Post test:

Spec.: Pitted (small), more general corrosion on base.

Narrow (vertical) region, opposite frit, had no pitting.

0.287 in unimmersed length

Actual S.A. = 2.66 cm^2

Soln.: Yellowish color w/ small dirtygreenish precipitate.

filtered w/ Whatman filter paper

calibration same as that on p. 29

pH 5.75 (24.6c)

DP 6/18/92

Test 009

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM^2)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP009
0 VS E
-200 VS R
1 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS^2)
EQ WT(GM)
DENSITY(GM/CM^3)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.84
PASS
PASS
PASS
PASS

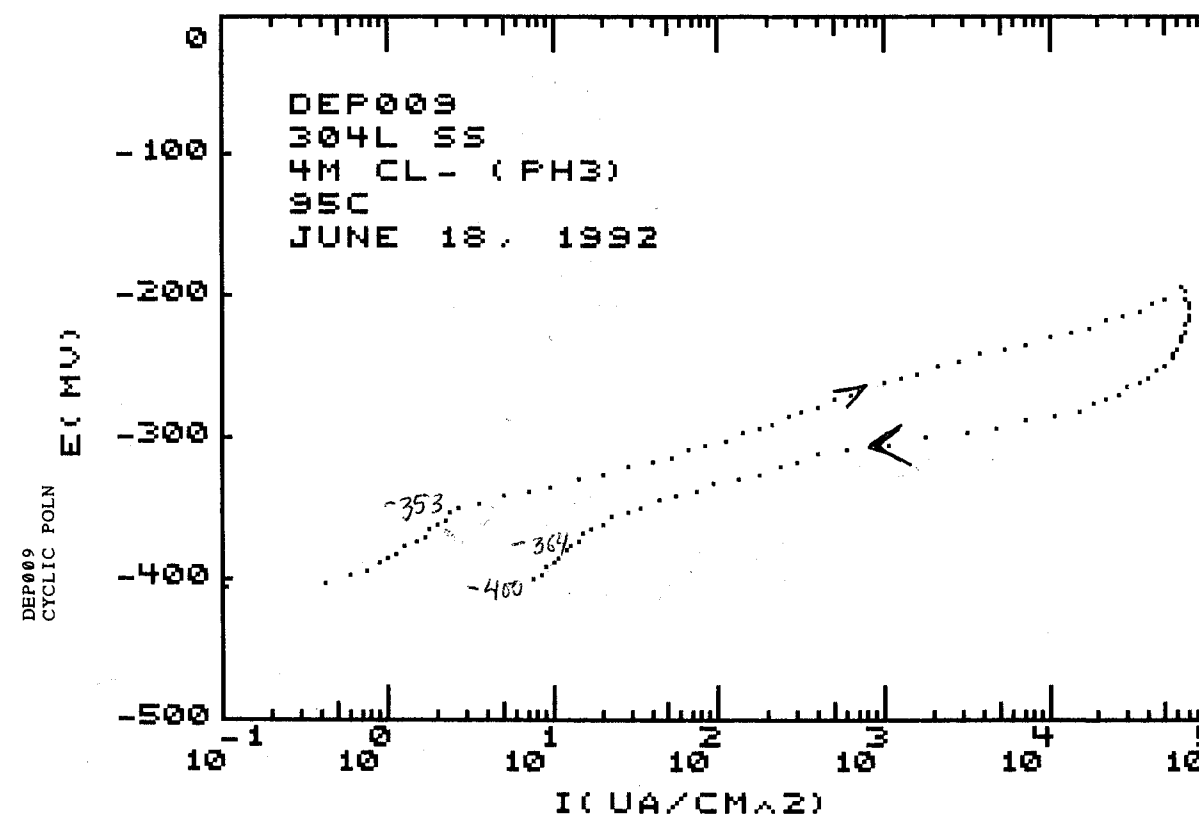
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-405
4
71830.98
-721.1268
.1084507
71830.98

LEGEND

DEP009 06/18/92
AISI 304L SS
HT T0954
4M CL-
PH3
AR PURGE
95C



Donald L. Pile
6/18/92

Test 010 DEPO10 - PILE1 disk

Specimen: DEPO10

AISI 304L SS Ht. 70954

$l = 0.750$ in.

$\phi = 0.250$ in

Immersed by visual inspection $3/4$ length into soln.

Estimated S.A. = 3.17 cm^2

Actual S.A. measured after test

Soln.: Test soln. 03A, see p.29

Test: Ar purge for 1 hr. liquid Carbonic Cylinder # RK3110

Specimen at O.C.P. for 1 hr. $28 < T < 31^\circ\text{C}$

Before scan $E_{\text{corr}} = -460 \text{ mV vs. SCE}$

$E_{\text{c.c.}} = 488 \text{ mV vs. SCE}$

$T_i = 31^\circ\text{C}$

Scan rate = 0.17 mV/s

$28 < T < 31^\circ\text{C}$

Post Test:

Spec.: Spec. pitted; distinct and somewhat evenly distributed pits.

Immersed length = 0.546 in.

Actual S.A. = 3.08 cm^2

Soln.: like the 95C test (009) but precipitate darker green (algae looking)

filtered w/ Whatman filter paper for pH test

Buffer Soln. pH 10.00 Fisher Lot No. 913908-24 (10.02/23.4C)

" 7.00 " 913828-24 (7.01/23.6C)

" 4.00 " 910359-24 (4.00/23.3C)

" 1.00 " 913288-18 (1.00/23.7C)

97.5 % slope

5.504 pH (24.0C)

25 6/19/92

Test 010

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM^2)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEPO10
0 VS E
0 VS R
0 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS^2)
EQ WT (GM)
DENSITY (GM/CM^3)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

3.17
PASS
PASS
PASS
PASS

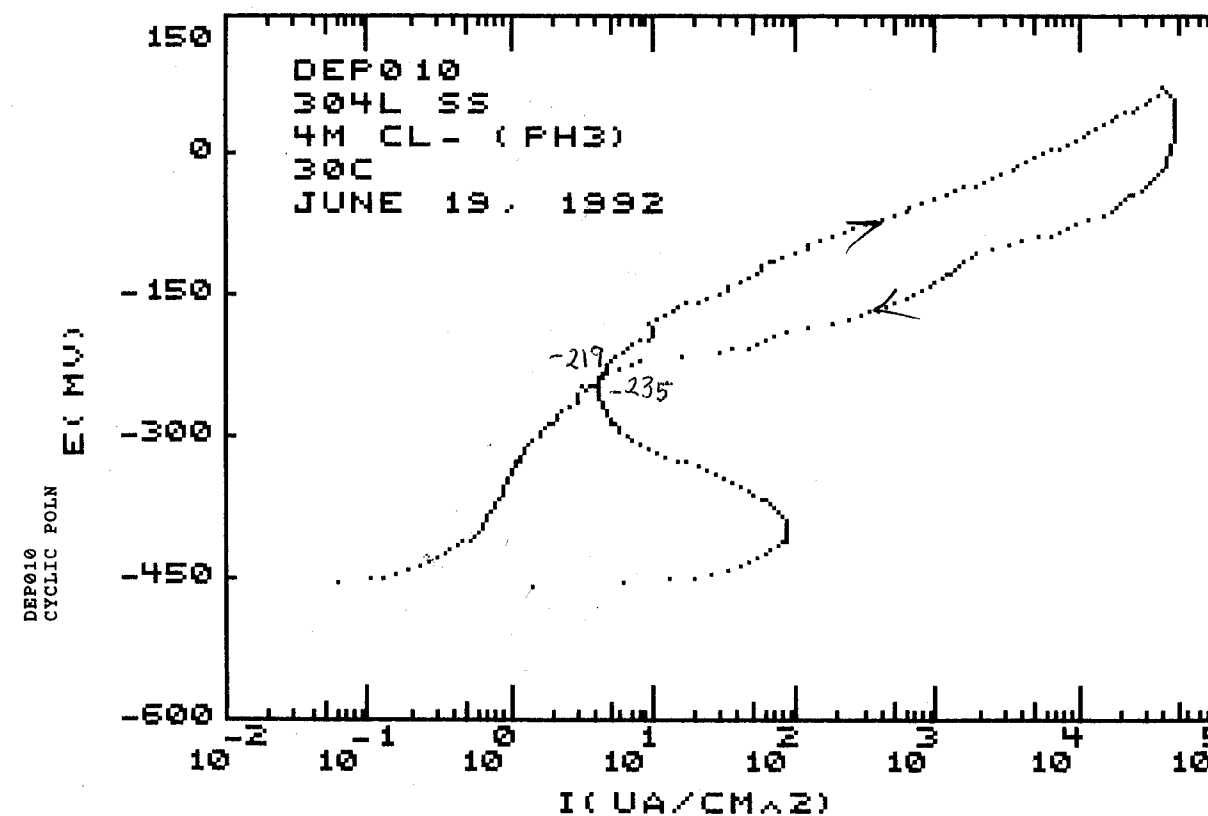
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-459
4
49053.63
-646.0568
6.309148E-02
49053.63

LEGEND

DEPO10 06/19/92
AISI 304L SS
HT 70954
4M CL-
PH3
AR PURGE
30C



Donald L. Pile
6/19/92

Test Soln. 03B4M Cl⁻ ~ 3pH

Buffer Soln. pH 7.00	Fisher Lot No. 913828-24	7.02 / 21.3C
" 4.00	" 910359-24	4.00 / 21.2C
" 1.00	" 913288-18	1.00 / 21.2C

94.9 % slope

233.92 g NaCl Fisher Lot No. 885407

Mettler

Nano pure water

6.5 ml N/10 HCl soln. (see p. 29)

~ 4.2 ml N/10 NaOH soln. (Fisher Lot No. 883432-24) to adjust pH
3.020 pH

} to 1 l

Test 011 DEPO11 - PILE 1 diskSpec. DEPO11

AISI 316L Ht. P80746

Immersed $\frac{2}{3}$ length by vis. inspect. $l = 0.749$ in $\phi = 0.249$ in.Estimated S.A. = 2.83 cm²Soln. Test Soln. 03B (see above)Test Ar purge 1 hr. Liquid Carbonic cylinder # RK3110Specimen at O.C.P. 1 hr. $28 < T < 31C$ Before scan $E_{corr} = -437$ mV vs. SCE $E_{CE} = 471$ mV vs. SCE $T_i = 28C$ $28 < T < 40C$ Post Test Spec. pitted and formed brown/goldish film.Immersed length = 0.471 in ; Actual S.A. = 2.69 cm²

Whatman filter paper filtered soln. (green ppts.)

pH 5.912 / 24.9C same calibration as above

DP 6/23/92

Test DEPO11

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEPO11
0 VS E
0 VS R
0 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.83
PASS
PASS
PASS
PASS

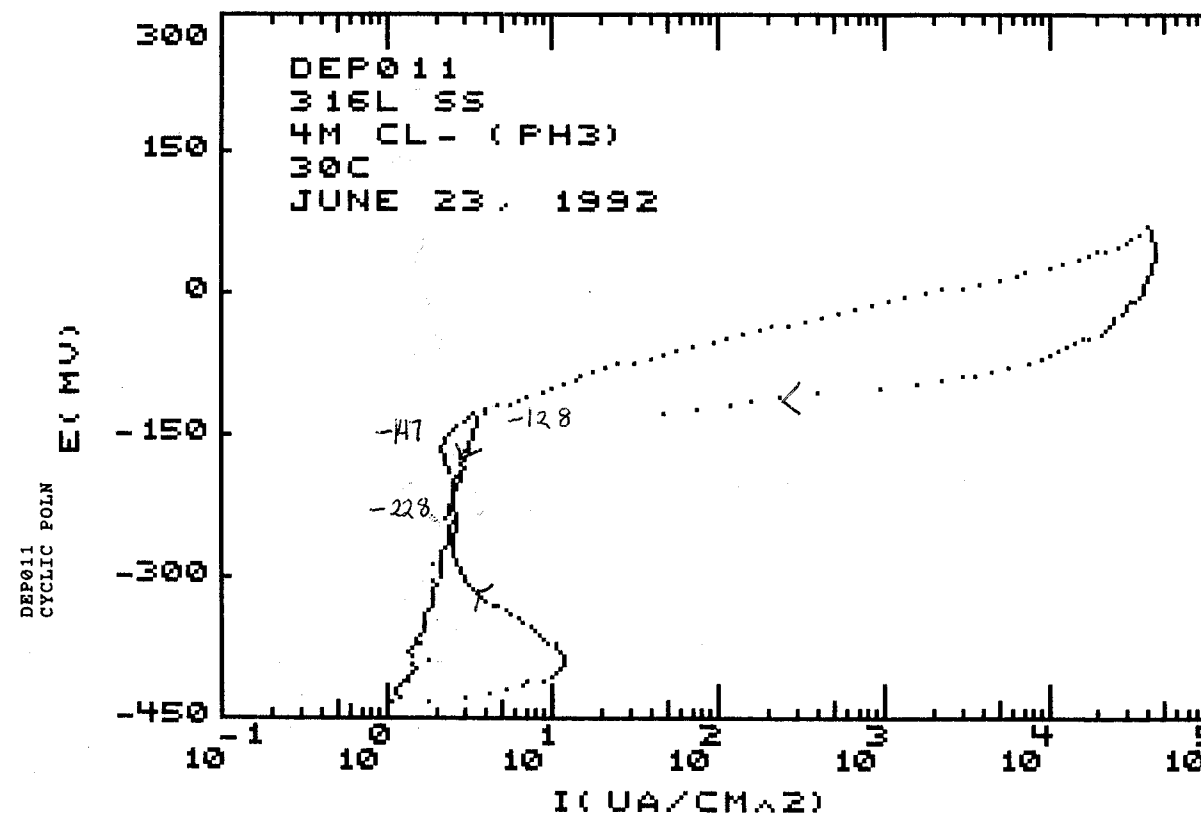
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-436
4
44416.96
-7236.75
.6077738
44416.96

LEGEND

DEPO11 06/23/92
AISI 316L SS
HT P80746
4M CL-
PH3
AR PURGE
30C



Donald L. Pike
6/23/92

Test 012 DEPO12 - PILE1 disk

Spec. DEPO12

AISI 316L SS Ht. P80746

 $R = 0.751 \text{ in}$ $\phi = 0.250 \text{ in}$ Immersed $\sim 2/3$ length into soln. Estimated S.A. = 2.85 cm^2

Soln. Test soln. 03B (seep 34)

Test. Ar purge $1\frac{1}{2}$ hr. Liquid Carbonic Cylinder # RK3110Specimen at O.C.P. 1 hr. $94\text{C} < 95\text{C}$ Before scan $E_{\text{corr}} = -346 \text{ mV vs. SCE}$ $E_{\text{c.e.}} = 468 \text{ mV vs. SCE}$ $T_i = 95\text{C}$ $T = 95$

Post Test

Spec. pitted (small); no clear soln. line so measure from upper most pits. Unimmersed length = 0.189 in .Actual S.A. = 3.16 cm^2

Soln. Whatman paper filtered out very small amount of green ppt.

Buffer Soln. pH 1.00 Fisher Lot No. 913288-B (1.00 / 23.5C)

" 4.00 " 910359-24 (4.00 / 23.4C)

" 7.00 " 913828-24 (7.01 / 23.2C)

95.9 % slope

4.867 pH (25.0C)

DP 6/24/92

Test DEPO12

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEPO12
0 VS E
-200 VS R
0 VS E
.17
35000
PASS
PASS
PASS
PASS

AMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.85
PASS
PASS
PASS
PASS

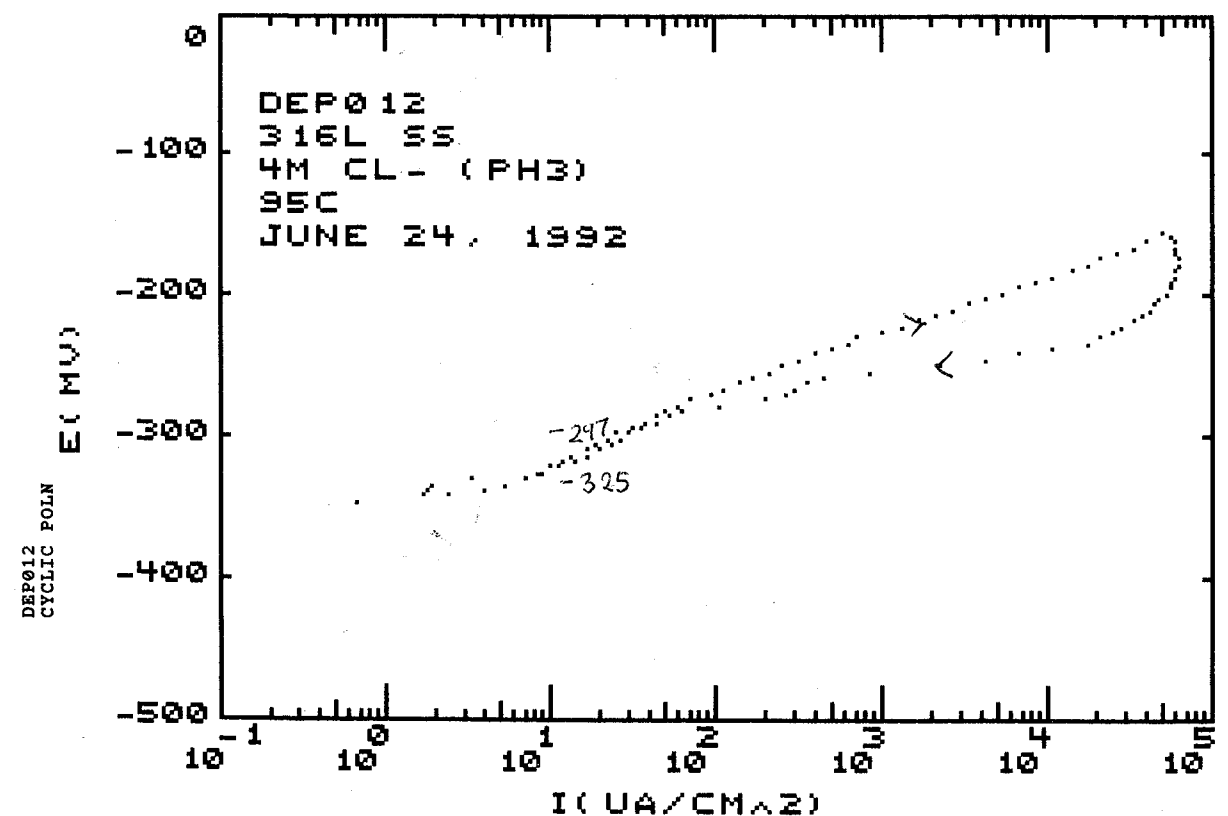
ATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-345
4
62105.27
-718.5965
.6631579
62105.27

EGEND

DEPO12 06/24/92
AISI 316L SS
HT P80746
4M CL-
PH3
AR PURGE
95C



Donald Z. Pike
6/24/92

Test soln. 04A 4MCl- pH1

233.75g NaCl Fisher Lot No. 885407 (Mettler)

8.2 ml conc. HCl Fisher Lot No. 920004

added to Nanopure H₂O, filled to 1L mark (vol. flask)

Buffer soln. pH 1.00 Fisher Lot No. 913288-18 (1.00 / 22.0°C)

" 4.00 " 910359-24 (4.00 / 21.8°C)

92% slope → recalibrate

Buffer soln. pH 7.00 Fisher Lot No. 913828-24

1.00 / 22.5°C 4.00 / 22.6°C 7.02 / 22.3°C

97.8% slope

~ 0.178 pH → discard

467.5g NaCl s.a.a.

added to Nanopure H₂O, filled to 2L mark (vol. flask) } semistock 04

7.728 pH (22.9°C)

600 ml of semistock soln. 04

180 ml N/10 HCl (p. 29) added to lower pH to 1.020

4MCl- diluted → discard Donald L. Pile 6/25/92

Buffer solns. s.a.a.

7.02 / 21.5°C 4.00 / 21.4°C 1.00 / 21.4°C

97.8% slope

stock soln 2N HCl

33 ml conc. HCl s.a.a. added to Nanopure H₂O to make 200 ml soln.

600 ml of semistock soln. 04 (pH 7.600 / 22.0°C)

5.1 ml 2N HCl soln (see above) added to lower pH to 1.020.

Donald Pile 6/26/92

Test 013 DEPO13 - PILE1 diskSpec. DEPO13

AISI 304L Ht. T0954

 $\lambda = 0.749 \text{ in.}$ $\phi = 0.249 \text{ in.}$ Spec. immersed $\frac{2}{3}$ length by visual inspectionEstimated S.A. = 2.83 cm²Soln. Test soln. 04A (see p. 38)Test. Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110Specimen at O.C.P. 1 hr. $31 < T < 28$ Before scan $E_{\text{corr}} = -462 \text{ mV vs. SCE}$ $E_{\text{CE}} = 439 \text{ mV vs. SCE}$ $T_i = 28^\circ\text{C}$ $28 \leq T \leq 30^\circ\text{C}$ Post-testSpec. Pitted, w/ slight etching of surface.

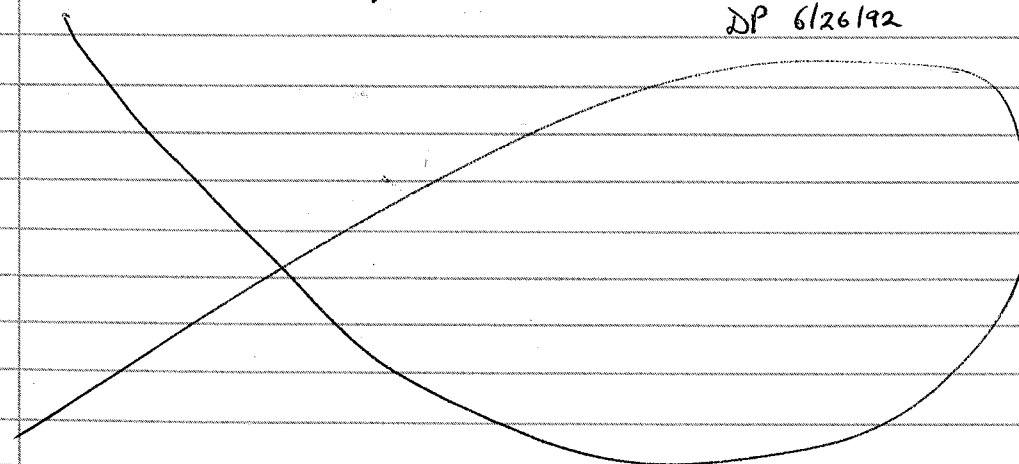
Unimmersed length = 0.165 in

Actual S.A. = 3.26 cm²Soln. No precipitates, but filtered anyhow w/ Whatman paper

Calibration same as bottom of p. 38

1.086 pH / 24.7°C

DP 6/26/92



RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP013
0 VS E
-50 VS R
0 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.83
PASS
PASS
PASS
PASS

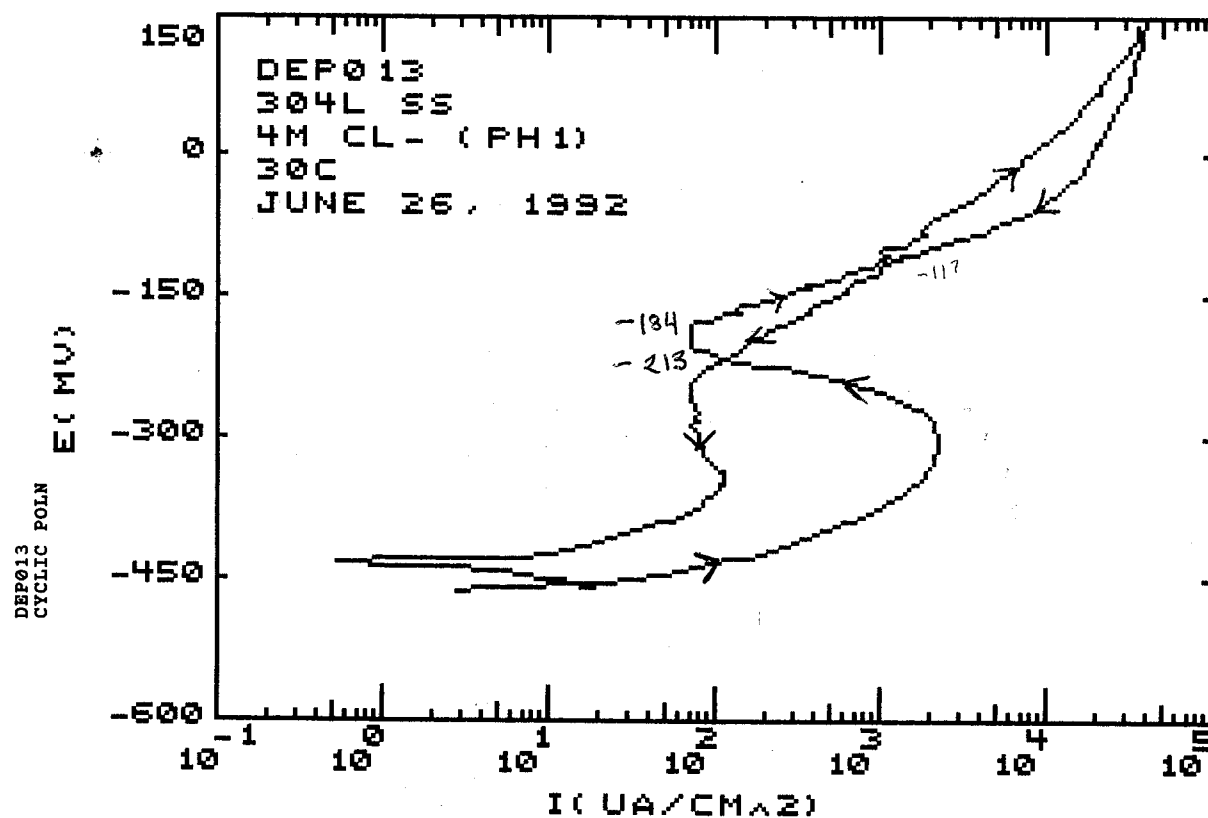
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-461
4
37243.82
-18.5159
.5265018
37243.82

LEGEND

DEP013 06/26/92
AISI 304L SS
HT T0954
4M CL-
PH1
AR PURGE
30C



Donald L. Pile 6/26/92

Test 014 DEP014 - FILE disk

Test Soln. 04B 4MCL- pH1

600 ml semistock soln. 04 (see pg. 38)

pH 6.584 / 20.4C

while stirring & monitoring pH added

2N HCl (see p. 38) coming to 4.4ml

pH 1.000 final

pH calibration:

Same buffers as p. 38

7.03/20.5C 4.00/20.4C

1.00/20.5C 97.2% slope

Spec. DEP014

AISI 304L SS HT T0954

$l = 1.906 \text{ cm}$ $\phi = 0.635 \text{ cm}$ Micrometer 20-M-1

Specimen immersed $3/4$ length by visual inspection

Estimated S.A. = 3.17 cm^2

Test Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110

Specimen at O.C.P. $1/2 \text{ hr. } 75\text{C} < T < 96$

$1/2 \text{ hr. } 95\text{C} > T > 93$

Before scan $E_{\text{corr}} = -439 \text{ mV vs. SCE}$

$E_{\text{C.E.}} = -203 \text{ mV vs. SCE}$

$T_i = 93\text{C}$ $93 < T < 95\text{C}$

Post test

Spec. General corrosion, grey/black color.

Unimmersed length = 0.557 cm

Actual S.A. = 3.01 cm^2

Soln. No precipitates; filtered w/ Whatman paper. Little mint color showing.

Calibration s.a.a.

1.281 pH / 25.8C

DP 6/29/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP014
0 VS E
-200 VS R
0 VS E
.17
32000
PASS
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

3.17
PASS
PASS
PASS
PASS

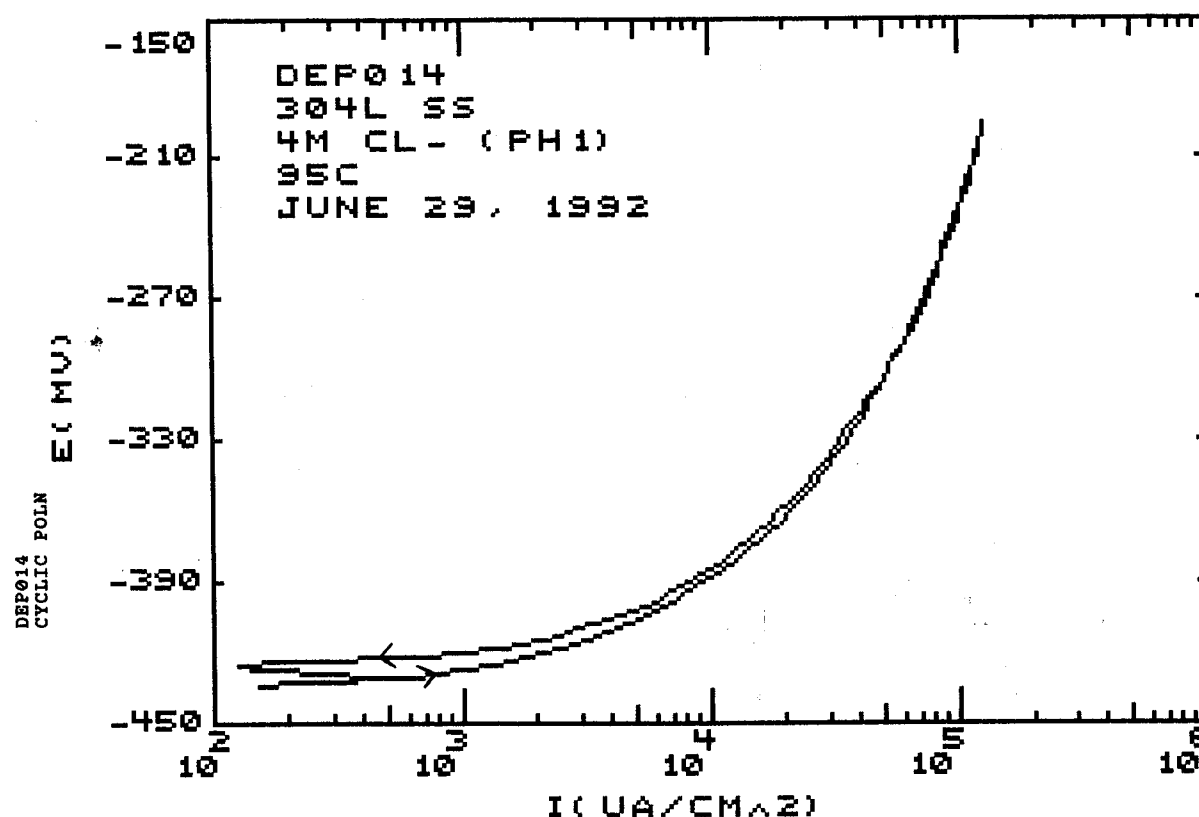
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-434
4
127760.3
-646.0568
126.183
127760.3

LEGEND

DEP014 06/29/92
AISI 304L SS
HT T0954
4M CL-
PH1
AR PURGE
95C



Donald L. Pree
6/29/92

Stock
Test Soln. 05 4MCl-

DP 6/29

467.54g NaCl Fisher Lot No. 385407

added to Nanopure water to make 2L soln.

Donald Pree 6/29/92

Test 015 DEP015 - PILE1 disk

Soln. 05A 4MCl-, pH1

600 ml stock soln 05 (above), 7.528

pH / 21.8C

While stirring and monitoring pH,

added ~5 ml 2N HCl soln

(p.38) to reach pH1 (2.002 / 21.9C)

pH calibration

same buffers as p.38

7.02 / 22.0C 4.00 / 21.9C

1.00 / 21.9C 97.3 % slope

Spec. DEP015

AISI 316L SS HT P80746

l = 1.905 cm ϕ = 0.635

Immersed $\frac{2}{3}$ length into soln.

Estimated S.A. = 2.85 cm²

Test Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr 27C < T < 30

Before scan E_{corr} = -402 mV vs. SCE

E_{c.e.} = 145 mV vs. SCE

T_i = 28C

28 < T < 30C

Post Test

Spec. Unimmersed length = 0.534 cm

Actual S.A. = 3.05 cm²

Small pits; ring around soln. surface level.

Soln. No precipitates; colorless.

Calibration S.A. 1.044 pH/24.9C

DP 6/30/92

Test 015

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP015
0 VS E
-50 VS R
0 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.85
PASS
PASS
PASS
PASS

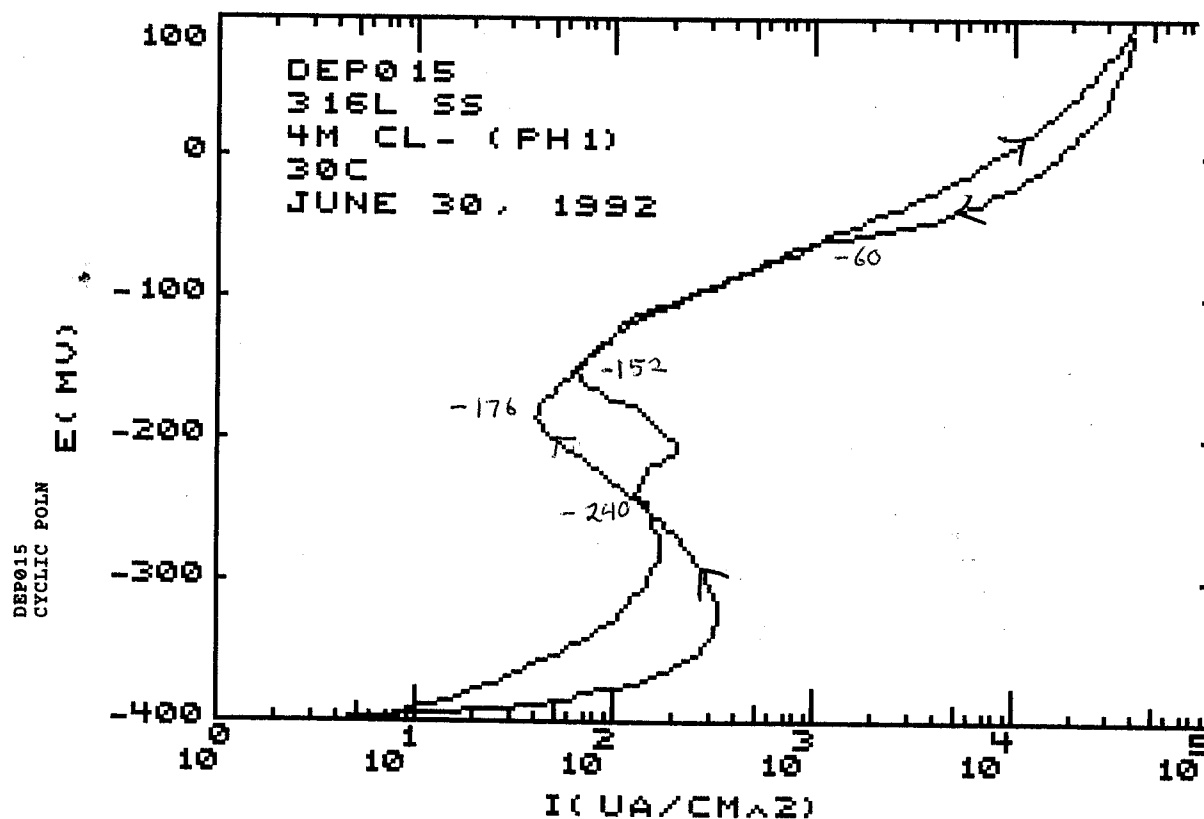
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-400
4
39333.34
-718.5965
3.814035
39333.34

LEGEND

DEP015 06/30/92
AISI 316L SS
HT P80746
4M CL-
PH1
AR PURGE
30C



Donald L. Pike
6/30/92

Test 016 DEP016 - PILE1 disk

Soln 05B

pH calibration: same buffers as on p. 38

7.02 pH/22.0C 4.00 pH/22.0C 1.00 pH/22.1C 97.2% slope

600 ml Stock soln 05 (p.43) (pH 6.970/22.1C)

added 4.4 ml 2N HCl stock soln to lower pH to 1.004 @ 22.3C
p.38

Spec. AISI 316L Ht. P80746

DEP016

 $l = 1.906 \text{ cm}$ $\phi = 0.635 \text{ cm}$ Spec. immersed $\frac{2}{3}$ length into soln.Estimated S.A. = 2.85 cm^2

Test Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr 95C < T < 96

Before scan $E_{\text{corr}} = -394 \text{ mV}$ $E_{\text{c.e.}} = -212 \text{ mV}$ $T_i = 95$ 94C < T < 95C

Post Test

Spec. General corrosion, dark corrosion product formed on surface.

Unimmersed length = 0.610 cm

Actual S.A. = 2.90 cm^2

Soln. No precipitates; slight touch of mint color.

Calibration S.A.A. 1.104 pH / 24.8C

DP7/1/92

See p. 80 & 81 for redo. (016R) DP 8/3/92

Test 016

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP016
0 VS E
-200 VS R
0 VS E
-17
35000
PASS
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.85
PASS
PASS
PASS
PASS

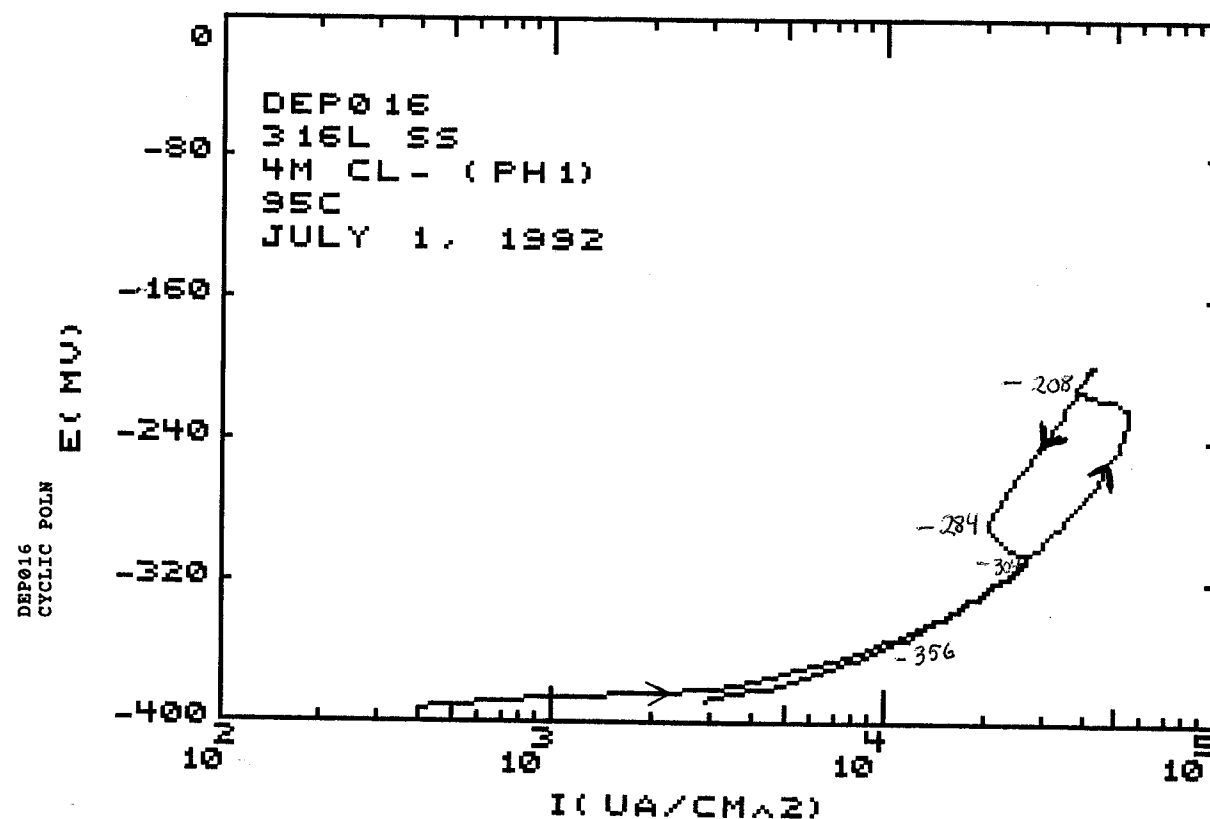
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-392
4
54070.18
-7185.965
400.7018
54070.18

LEGEND

DEP016 07/01/92
AISI 316L SS
HT P80746
4M CL-
PH1
AR PURGE
95C



Donald R. Rie
7/01/92

Test 017 DEP017 - PILE1 disk

Soln. 05C

pH calibration: same buffers as on p.38

7.02 pH / 22.2C 4.00 pH / 22.0C 1.00 pH / 22.1C

97.1% slope

600 ml Stock Soln. 05 (p.43) 6.715 pH / 21.9C

added 4.3 ml 2N HCl stock soln. (p.38) to lower pH to 1.002 @ 22.2C

Spec. Incoloy 825 Ht. HH4371FC

DEP017

 $l = 1.923 \text{ cm}$ $\phi = 0.640 \text{ cm}$ Spec. immersed $\frac{2}{3}$ length by visual inspectionEstimated S.A. = 2.90 cm^2

Test Ar. Purge 1 hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr $93C < T < 94$ Before scan $E_{\text{corr}} = -342 \text{ mV vs. SCE}$ $E_{\text{c.e.}} = -189 \text{ mV vs. SCE}$ $T_i \leq 94C$ $94C < T < 98C$

Post Test

Spec. Pitted; larger, polkadot-like. Dark corrosion product formed inside pits.

Unimmersed length = 0.611 cm Actual S.A. = 2.96 cm^2

Soln. No precipitates; slight mint/green color.

Calibration s.a.a. 1.064 pH / 29.0C

DP 7/2/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP017
0 VS E
-200 VS R
0 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.9
PASS
PASS
PASS
PASS

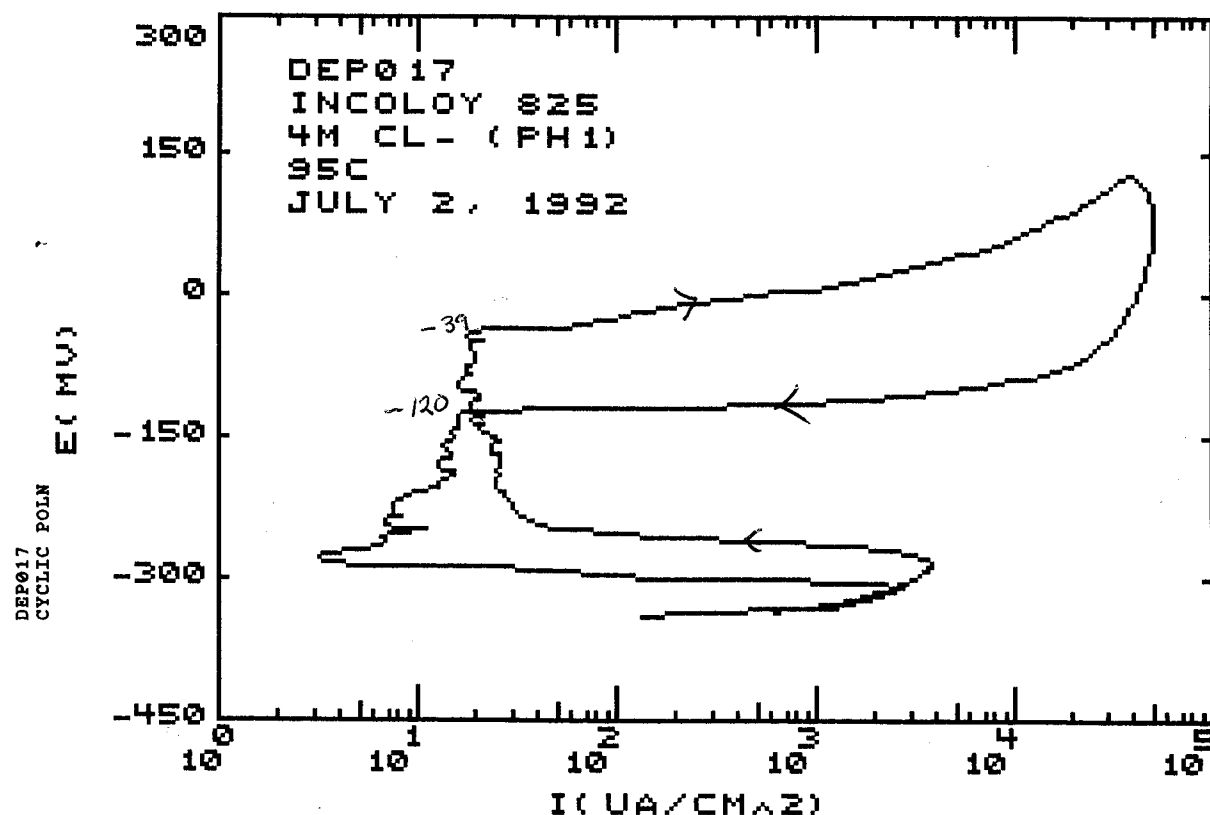
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-340
4
51551.72
-70.62069
3.224138
51551.72

LEGEND

DEP017 07/02/92
INCOLOY 825
HT HH4371FC
4M CL-
PH1
AR PURGE
95C



Donald L. Pile
7/2/92

Soln 06 4M CL-

467.54g NaCl Fisher Lot No. 835407 (Mettler)

added to Nanopure water to make 2L soln.

Donald L. Pile 7/2/92

Test 018 DEP018 - PILE1 disk

Buffer Soln. pH 7.00 Fisher Lot No. 913828-24 7.02/21.4C

" pH 10.00 " 913908-24 10.05/21.4C

" pH 1.00 " 913288-18 1.00/21.4C

99.4 % slope

Soln.

600ml Stock Soln. 06 (see above) pH 6.840 / 21.3C

10.00ml conc. HCl Fisher Lot No. 920004 to lower pH to 0.028 at 22.4C

Spec DEP018

Incoloy 825 HT. HH4371FC

$\phi = 0.640$ cm $l = 1.910$ cm

Spec. immersed $\frac{2}{3}$ length into soln.

Estimated S.A. = 2.88 cm²

Test Ar purge 1 hr. Liquid Carbonic Cyl. # RK3110

Spec. at O.C.P. 1 hr. 10min 94 < T < 95C

Before scan $E_{corr} = -283$ mV vs. SCE

$E_{c.e.} = 176$ mV vs. SCE

$T_i = 95C$ 95 < T < 96C

Post Test

Spec. General Corrosion

Unimmersed length = 0.685

Actual S.A. = 2.78 cm²

Soln. No precipitates. Slight mint-green color

calibration s.a.a. 0.012 pH / 24.8C

DP 7/8/92

See p. 90 & 91 for redo (018R)

DP 8/3/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP018
0 VS E
-100 VS R
0 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.88
PASS
PASS
PASS
PASS

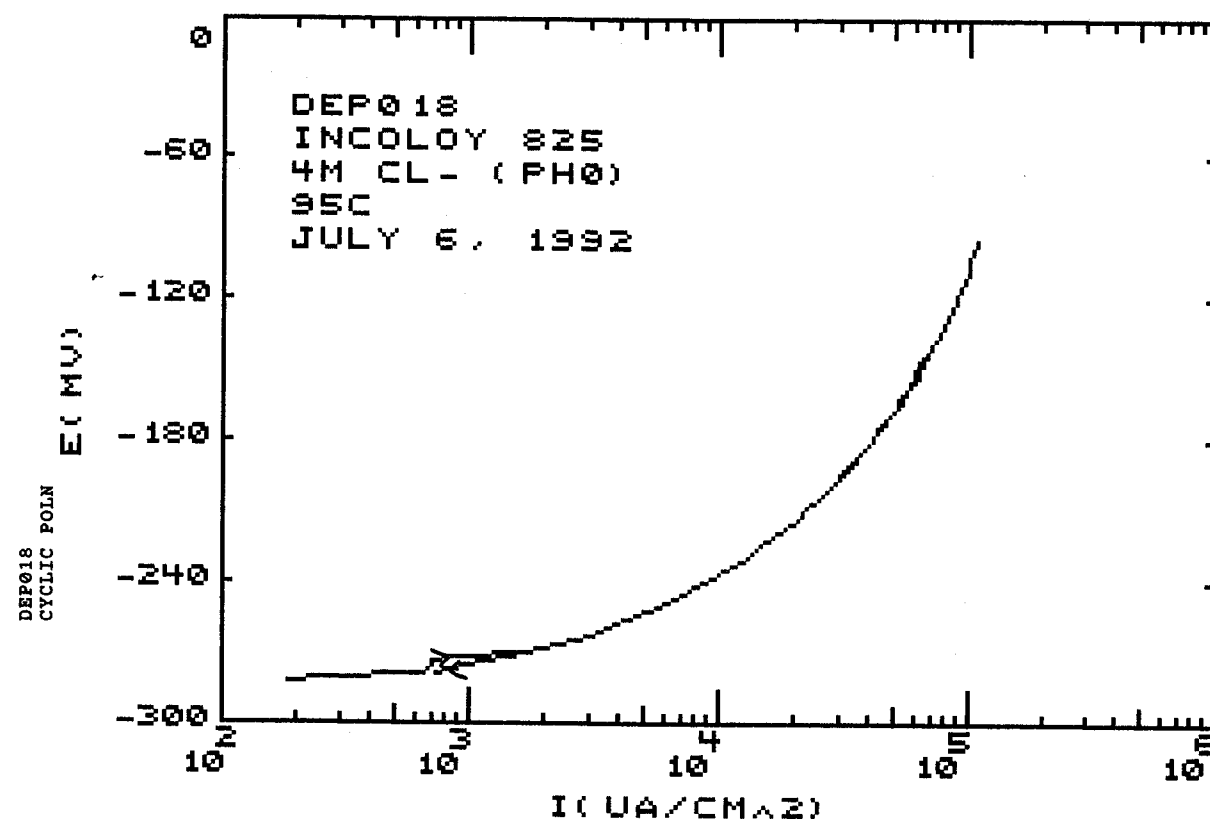
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-282
4
108680.6
-711.1111
184.7222
108680.6

LEGEND

DEP018 07/06/92
INCOLOY 825
HT HH4371FC
4M CL-
PH0
AR PURGE
95C



Donald Z. Pilo
7/6/92

Test 019 DEP019 - PILE1 disk

Buffer Solns. same as on p. 49

7.02 / 21.1C 10.09 / 21.1C 1.00 / 21.4C 99.2% slope

600 ml Stock Soln. 06 (4M Cl-) p. 49 pH 7.583 / 21.4C

added 12.3 ml conc. HCl see p. 49 to lower to pH 0.025 / 22.0C

Incoloy 825 Ht. HH4371FC

$\phi = 0.641$ cm $l = 1.926$ cm

Specimen immersed $\frac{2}{3}$ length into soln.

Estimated S.A. = 2.91 cm²

Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr. $28 < T < 29$ C

Before scan $E_{\text{corr}} = -284$ mV vs. SCE

$E_{\text{c.e.}} = 447$ mV vs. SCE

$T_i = 28$ C

The temperature reached 40C and was "reduced" to maintain 30C by end of scan.

Spec. Uniform corrosion (etched) w one pit at center of base

Unimmersed length of spec. = 0.587 cm

Actual S.A. = 3.02 cm²

Soln. Yellow color to soln., no precipitates
calibration s.a.a.

0.008 pH / 25.2C

DP 7/7/92

Test 019

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP019
0 VS E
-100 VS R
0 VS E
.17
35000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.91
PASS
PASS
PASS
PASS

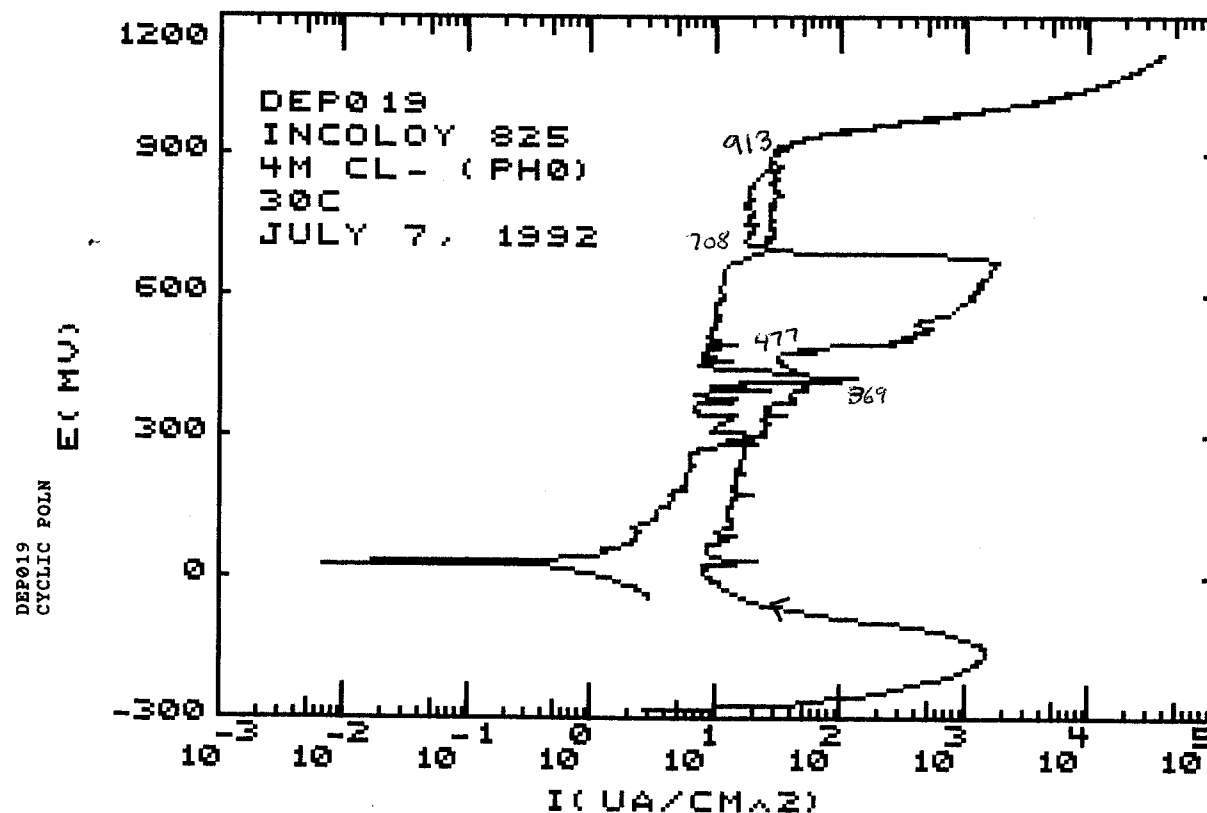
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-284
4
39347.08
-70.37801
6.872852E-03
39347.08

LEGEND

DEP019 07/07/92
INCOLOY 825
HT HH4371FC
4M CL-
PH0
AR PURGE
30C



Donald J. Pile
7/7/92

Test 020

pH Meter Calibration (7/8/92)

Buffer Soln.	pH	Fisher Lot No.	Temp
	7.00	913828-24	7.02 / 21.4C
"	4.00	910359-24	4.00 / 21.4C
"	1.00	913288-18	1.00 / 21.8C

97.1% slope

Stock Soln. 07

467.53g Reagent Grade NaCl Fisher Lot No.s 880482 & 885407 (Mettler)
added to 2.0 L Nanopure water

Test 020 (DEP020 FILE 1 disk)

600 ml stock soln 06 (p.49) 7.422 pH / 21.4C
added 10.0 ml conc. HCl Fisher Lot No 920004 to bring to pH 0.018 / 21.8C

ASTI 304L SS HT T0954

$\phi = 0.636$ cm $l = 2.003$ cm

Specimen immersed $\sim 2/3$ length into soln.Estimated S.A. = 2.98 cm²

Ar purge 1 hr. 20 min Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr 10 min 28C < T < 30C

Before scan $E_{corr} = -426$ mV vs. SCE $E_{c.e.} = 363$ mV vs. SCE $T_i = 28C$

27C < T < 28C for test dur.

Spec. Unimmersed length = 0.593 cm

Actual S.A. = 3.13 cm²

Uniform corrosion (etched), some black film

Soln. Minute hint at mint-green color; no precipitates
pH Calibration s.a.a.

0.028 pH / 24.7C

SP 7/8/92

Test 020

UN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP020
0 VS E
-100 VS R
0 VS E
.17
10000
PASS
PASS
PASS

AMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.98
PASS
PASS
PASS
PASS

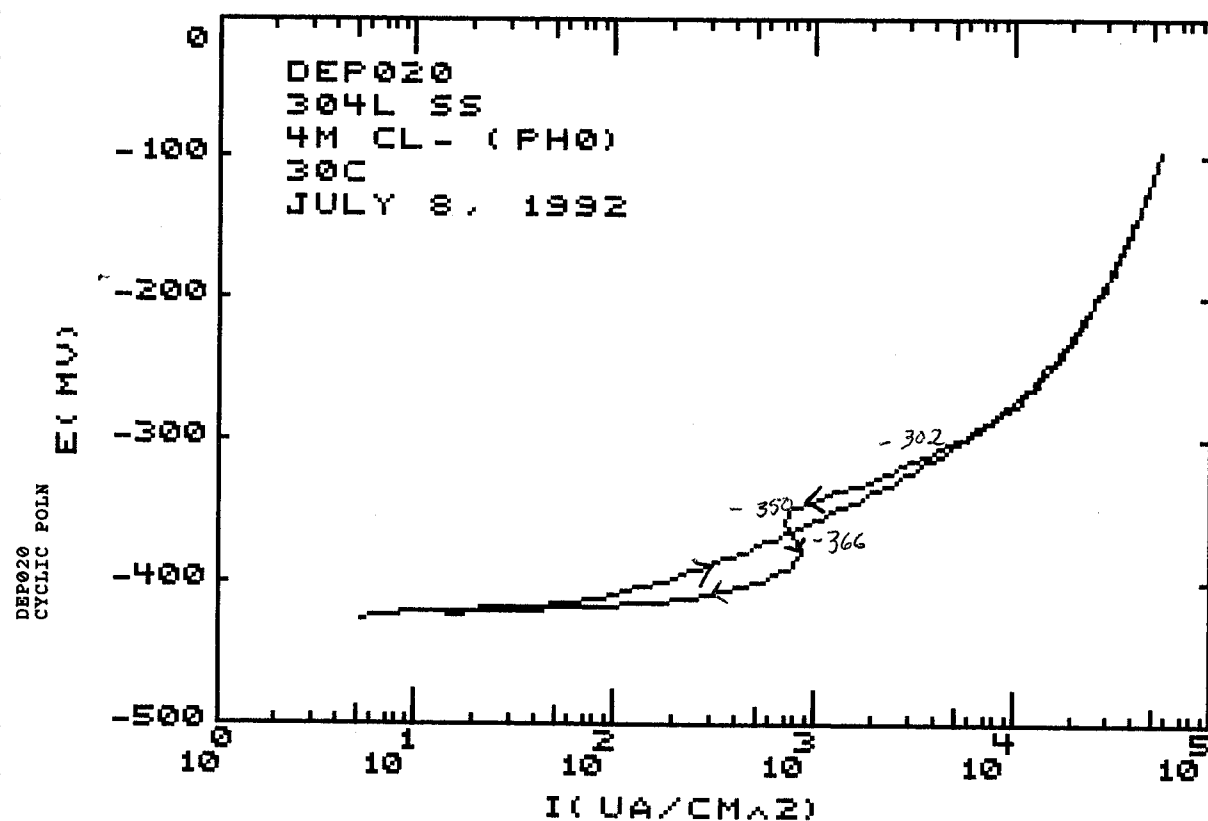
ATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-426
4
56711.41
-687.2483
5.459732
56711.41

EGEND

DEP020 07/08/92
AISI 304L SS
HT T0954
4M CL-
PH0
AR PURGE
30C



Donald L. Pile
7/8/92

Test 021 DEP 021 - PILE2 disk

600 ml stock soln 07 (p.53) 8.172 pH / 21.4C (Mettler) DP718
added 50.0 ml conc. HCl Fisher Lot No. 920004 resulting in pH -0.300 / 24.3C
363.6 mV

Incoloy 825 Ht. HM 4371 FC

Ø = 0.640 cm l = 1.929 cm

Specimen immersed ~ 2/3 length into soln.

Estimated S.A. = 2.9 cm²

Ar purge 1 hr. Liquid Carbonic Cylinder # 466156

Specimen at O.C.P. 1 hr. 20 min. 30C < T < 45C

Before scan E_{corr} = -290 mV vs. SCEE_{CE} = 30 mV vs. SCET_i = 30C

30C < T < 31C for test dur.

Thermometer: Fisher Brand Tag. No. 1238002

Potentiostat: EG&G Princeton Applied Research Model 273

Serial No. 41108

Spec. Unimmersed length = 0.600 cm

Actual S.A. = 2.99 cm²

Etched surface

Soln. No precipitates.

pH calibration same as p.53

-0.355 pH / 25.8C

DP 7/8/92

Test 021

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM^2)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP021
0 VS E
-100 VS R
0 VS E
.17
10000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS^2)
EQ WT(GM)
DENSITY(GM/CM^3)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.9
PASS
PASS
PASS
PASS

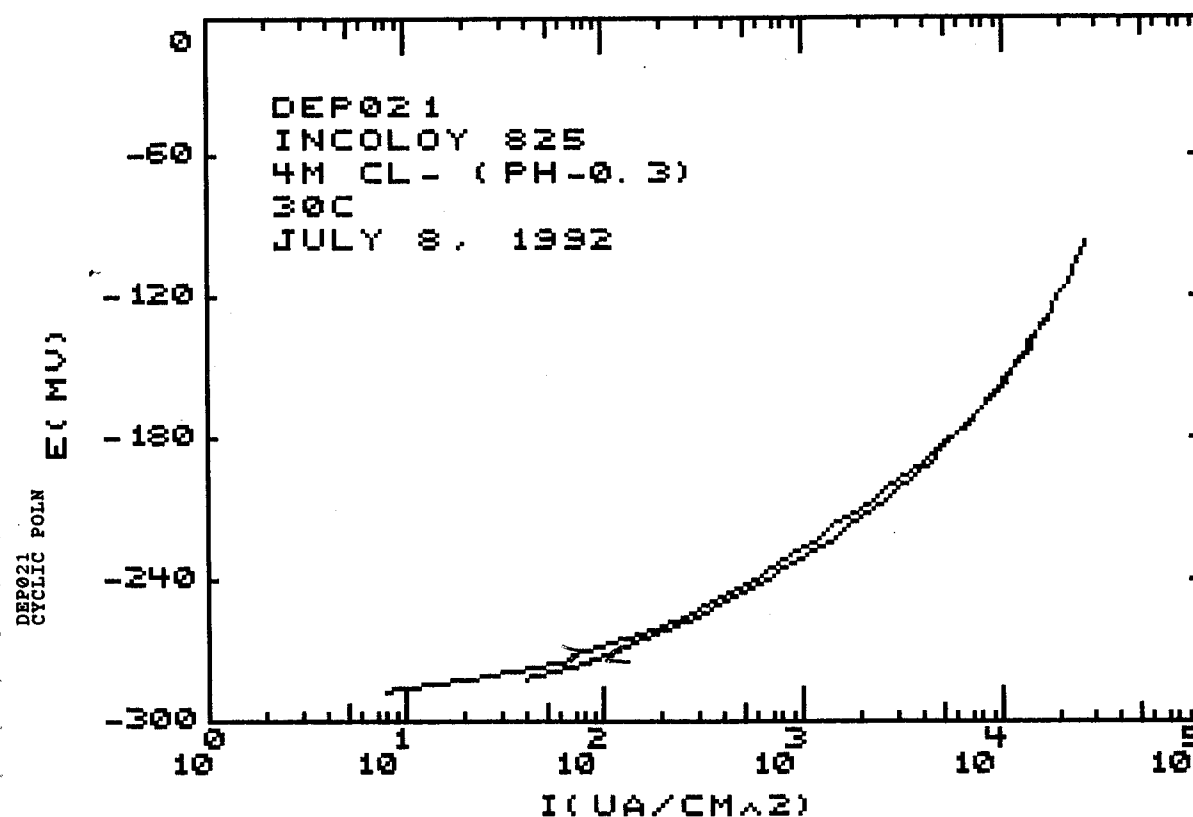
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-287
4
26137.93
8.034483
8.034483
26137.93

LEGEND

DEP021 07/08/92
INCOLOY 825
HT HH4371FC
4M CL-
PH-0.3
AR PURGE
30C



Donald Z. Pile
7/8/92

825 Verification

The Incoloy 825 Specimens machined at the Machine Shop were analyzed to verify they were indeed 825 and not some other alloy.

Below are the results from EDX.

1,30
*QUANT
0.0 ERROR-NT 6
*X

SO: QUANTIFY

DIV. 20 - 825??
Standardless Analysis
20.0 KV 39.3 Degrees

20KV, WD=24

Chi-sqd = 1.20

Element	Rel. K-ratio	Net Counts
Ni-K	0.38700 +/- 0.00390	48228 +/- 486
Ni-L	0.03867 +/- 0.00189	2953 +/- 144
Fe-K	0.29078 +/- 0.00270	51567 +/- 478
Cr-K	0.23404 +/- 0.00200	56068 +/- 479
Mo-L	0.02217 +/- 0.00141	7486 +/- 475
Cu-K	0.01682 +/- 0.00287	1722 +/- 294
Ti-K	0.00889 +/- 0.00084	2722 +/- 258
Si-K	0.00163 +/- 0.00043	726 +/- 193

ZAF Correction 20.00 kV 39.34 deg
No. of Iterations = 3

Element	K-ratio	Z	A	F	Atom%	Wt%
Ni-K	0.397	0.986	1.065	1.000	40.21	41.69
Fe-K	0.298	1.005	1.048	0.939	29.92	29.50
Cr-K	0.240	1.009	1.021	0.917	24.70	22.68
Mo-L	0.023	1.085	1.238	0.996	1.80	3.05
Cu-K	0.017	1.033	1.049	1.000	1.67	1.87
Ti-K	0.009	1.010	1.045	0.920	1.05	0.88
Si-K	0.002	0.911	2.128	0.999	0.65	0.32
Total= 100.00%						

Designations Specifications Composition Notes Forms Graphs
Properties Application Classes Rankings Top

Element	Min. %	Max. %
Ni	38.	46.
Fe	22.	37.9
Cr	19.5	23.5
Mo	2.5	3.5
Cu	1.5	3.
Ti	.6	1.2
C	.	.05
Mn	.	1.
S	.	.03
Si	.	.5
Al	.	.2

NCO.DB

ss F1 for help
INCOLOY 825

ALL

Donald Pile 7/8/92

Test 022 DEP022 - PILE1 disk

pH Meter Calibration

Buffer Soln. pH 7.00 Fisher Lot No. 913828-24 7.02 / 21.5C
 " 10.00 " 913908-24 10.05 / 21.5C
 " 1.00 " 913288-18 1.00 / 21.6C

99.1% slope

600 ml stock soln 07 (p. 93) 7.845 pH / 21.5C
 added 4.4 ml 2N HCl soln (p. 38) bringing soln to pH 1.988 / 21.8C

Incoloy 825 Ht. HH4371FC

$\phi = 0.640$ cm $l = 1.920$ cm

Specimen immersed $\sim 2/3$ length into soln.

Estimated S.A. = 2.89 cm²

Ar purge 1 hr. 10 min Liquid Carbonic Cylinder # RK8110

Specimen at O.C.P. 1 hr. $29C < T < 32C$

Before scan $E_{corr} = -324$ mV vs. SCE

$E_{GE} = 454$ mV vs. SCE

$T_i = 29C$

$T_f = 26C$

$26C < T < 29C$

Spec. Some goldish brown film, no pits, general corrosion.

Unimmersed length = 0.639 cm

Actual S.A. = 2.89 cm²

Soln. Before reverse canary yellow (like Mellow Yellow)

After " goldish yellow (like heated butter)

Some orange/gold/brown precipitates, filtered w/ Whatman paper

3.429 pH / $24.4C$

DP 7/9/92

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E (MV)
 VERTEX E (MV)
 FINAL E (MV)
 SCAN RATE (MV/S)
 THRESHOLD I (UA/CM²)
 CONDITION E (MV)
 CONDITION T (S)
 INIT DELAY (MV/S OR S)

CYCLIC POLN
 DEP022
 0 VS E
 -100 VS R
 0 VS E
 .17
 100000
 PASS
 PASS
 PASS

SAMPLE PARAMETERS

AREA (CMS²)
 EQ WT (GM)
 DENSITY (GM/CM³)
 CATHODIC TAFEL (MV)
 ANODIC TAFEL (MV)

2.89
 PASS
 PASS
 PASS
 PASS

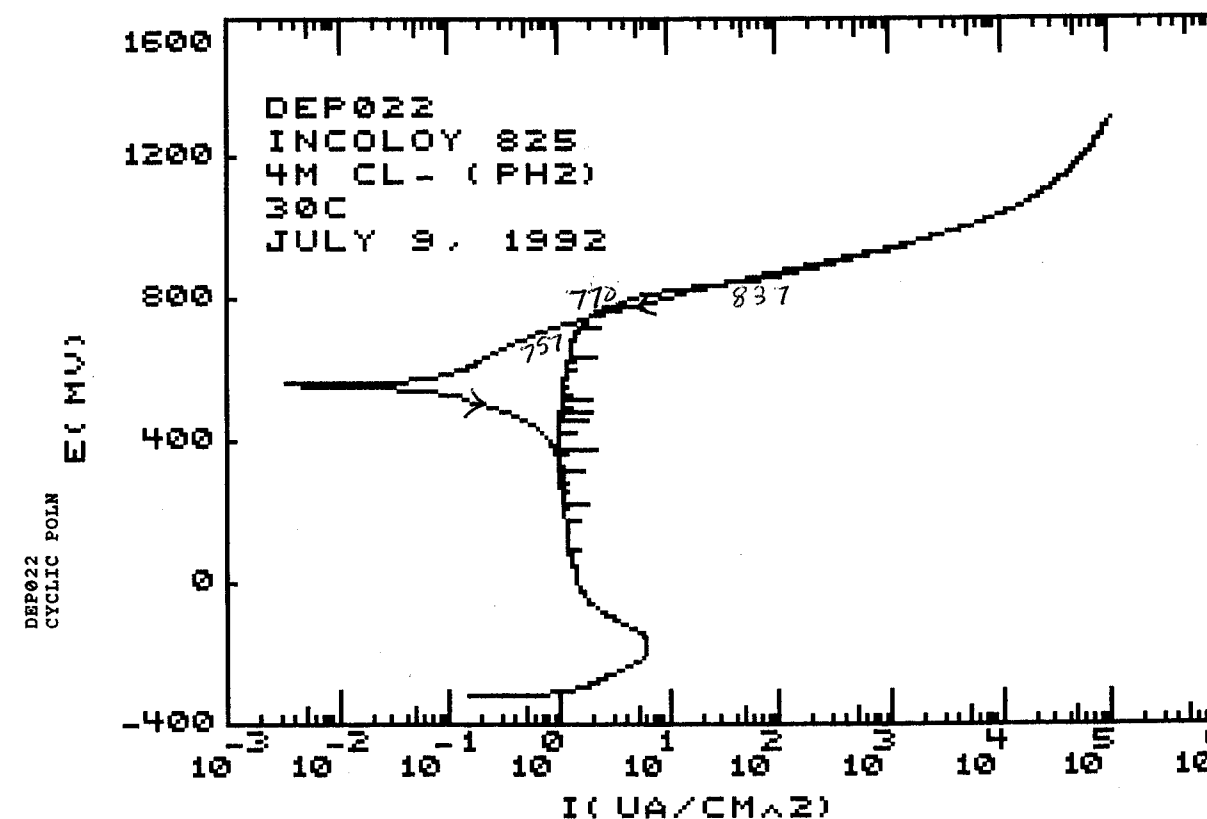
DATA SCALE

ECORR
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-323
 4
 102768.2
 -934256
 3.460207E-03
 102768.2

LEGEND

DEP022 07/09/92
 INCOLOY 825
 HT HH4371FC
 4M CL-
 PH2
 AR PURGE
 30C



Donald L. Pile
 7/9/92

Test 023 DEPO23 - PILE 1 disk

pH Meter Calibration

same buffer solns. as on p. 58

7.02 / 21.6 C 10.05 / 21.6 C 1.00 / 22.0 C 99.2% slope

DP 7/10/92

Stock Soln. 08

58.43 g Reagent Grade NaCl Fisher Lot No. 885407 (Mettler)

added to 2L Nanopure Water

DP 7/9/92

600 ml Stock Soln. 08 (above)

28 ml 2N HCl Stock Soln. (p. 38) to bring soln. to 1.008 pH / 22.5 C

Incoloy 825 Ht. HH4371FC

$\phi = 0.639$ cm $l = 1.926$ cm

Specimen immersed $\frac{2}{3}$ length into soln.

Estimated S.A. = 2.90 cm²

Ar purge $1\frac{1}{4}$ hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr $91^\circ < T < 92^\circ$

Before scan $E_{\text{corr}} = -302$ mV vs. SCE

$E_{\text{O.C.P.}} = 11$ mV vs. SCE

$T_i = 92^\circ$

$91^\circ < T < 92^\circ$

Spec. Pitted, black corrosion product in pits.

Unimmersed length = 0.642 cm

Actual S.A. = 2.90 cm²

Soln. No precipitates, slight hint of green color.

calibration same as above

0.998 pH / 24.6 C

DP 7/10/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEPO23
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.9
PASS
PASS
PASS
PASS

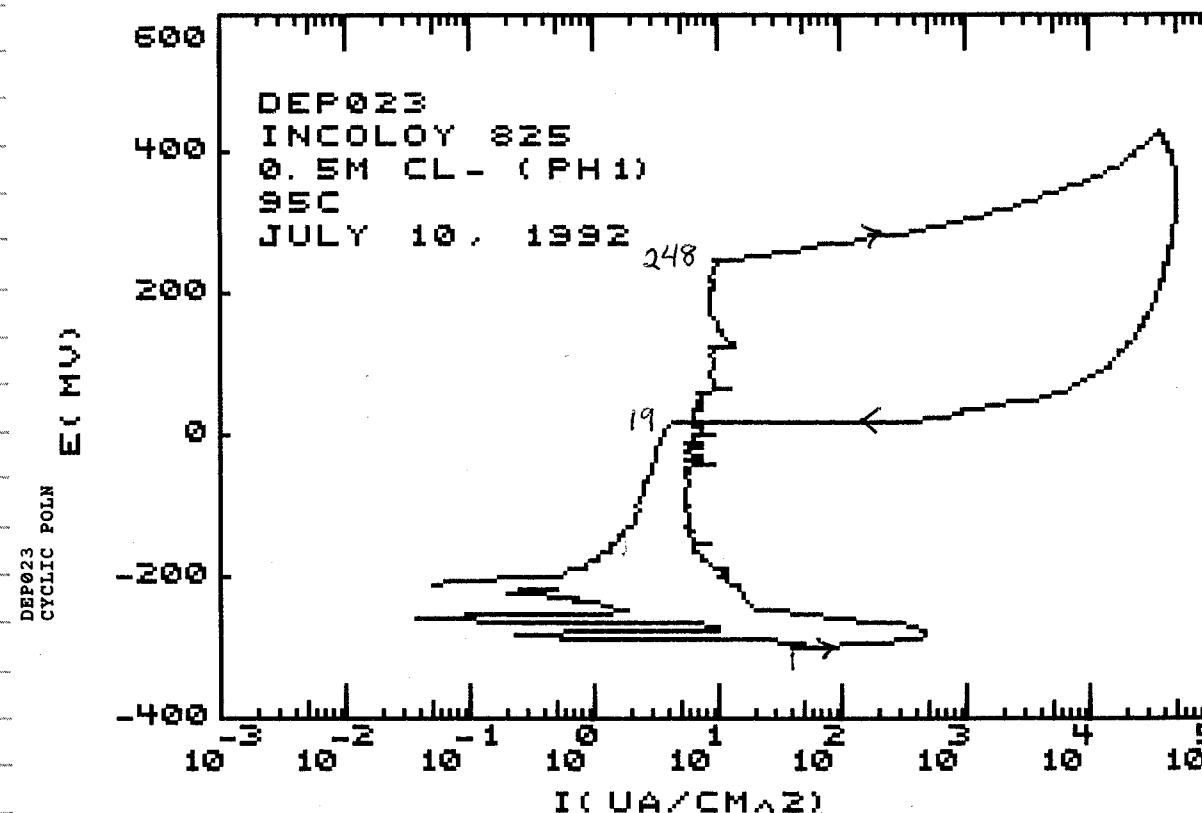
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-301
4
50586.21
-7062.069
0
50586.21

LEGEND

DEPO23 07/10/92
INCOLOY 825
HT HH4371FC
0.5M CL-
PH1
AR PURGE
95C



Donald L. Pike
7/10/92

Test 024 DEP024 - PILE1 disk

pH meter calibration

Buffer soln. pH 7.00 Fisher Lot No. 913828-24 7.02 / 21.5C

" 4.00 " 922046-24 4.00 / 21.3C

" 1.00 " 913288-18 1.00 / 21.9C

96.9% slope

600 ml Stock Soln 08 (0.5M Cl-) p. 60

added 25 ml 2N HCl acid (p. 38) to bring soln. to pH 1.030 / 21.8C

AISI 304L SS HT T0954

 $\phi = 0.632 \text{ cm}$ $l = 1.905 \text{ cm}$ Specimen immersed $\frac{2}{3}$ length into soln.Estimated S.A. = 2.83 cm^2

Ar purge 1 hr. Liquid Carbonic Cylinder RK3110

Spec. at O.C.P. 1 hr. $91C < T < 93C$ Before scan $E_{\text{corr}} = -407 \text{ mV vs. SCE}$ $E_{\text{C.E.}} = -119 \text{ mV vs. SCE}$ $T_i = 92C$ $92C < T < 93C$

Spec. Pitted and etched.

Unimmersed length = 0.571 cm Actual S.A. = 2.96 cm^2

Soln. slight tint of wintergreen color; no precipitates

Some water from bubbler back flowed into soln.; approximately

10-20 ml (compared to 625 ml)

calibration same as above

1.049 / 24.7C

DP 7/13/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP024
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CM²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.83
PASS
PASS
PASS
PASS

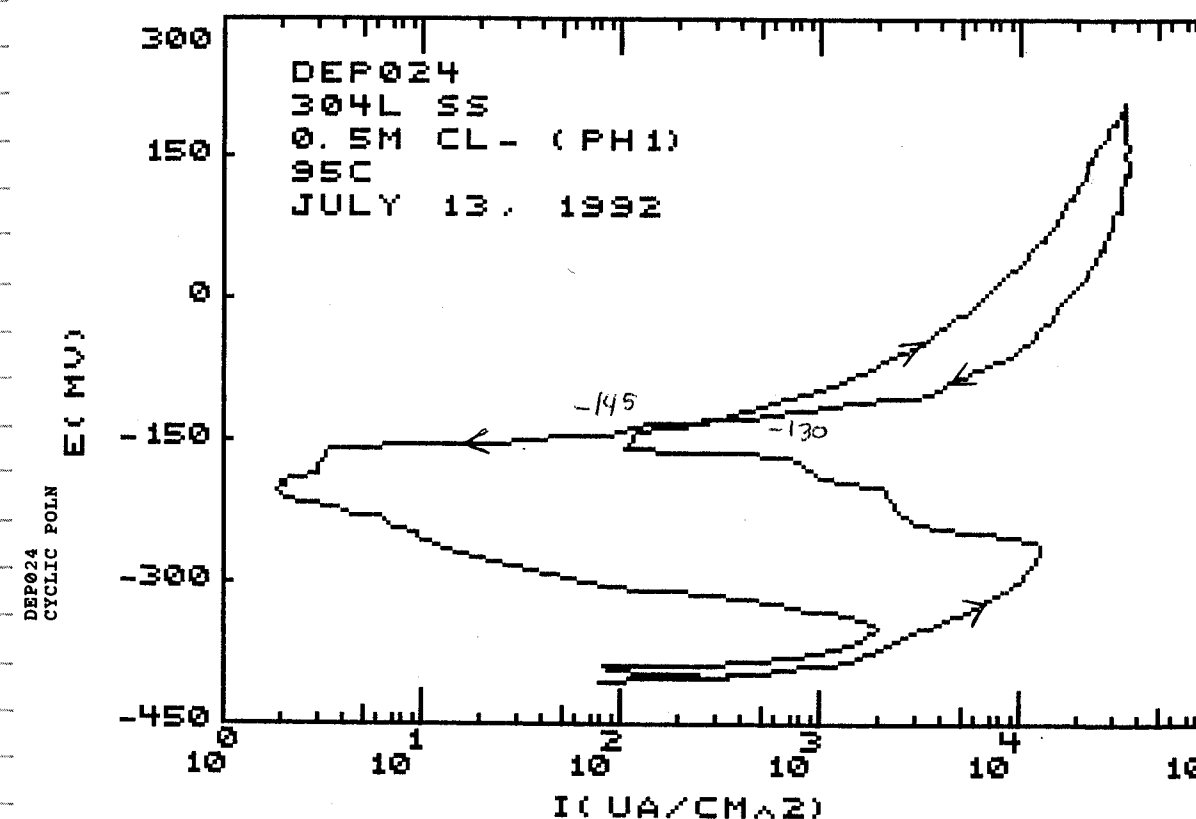
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-406
4
35971.73
-723.6749
1.908127
35971.73

LEGEND

DEP024 07/13/92
AISI 304L SS
HT T0954
0.5M CL-
PH1
AR PURGE
95C



Donald L. Pile
7/13/92

Test 025 DEP025 - PILE1 disk

Buffers same as p. 62

7.02 / 21.5C 4.00 / 21.8C 1.00 / 21.8C

97.2 % slope

600 ml Stock Soln 08 (0.5M Cl-) p. 60 ~ 5.8 pH

added 67 ml Conc. HCl Fisher Lot No. 920004 to bring to pH 4.20 DP 7/14/25.4C

Incoloy 825 Ht. HH4371FC

$\phi = 0.639$ cm $l = 1.924$ cm

Specimen immersed $\frac{2}{3}$ length into soln.

Estimated S.A. = 2.89 cm²

Ar purge 1 hr. Liquid Carbonic Cylinder RK3110

Spec. at O.C.P. 1 hr. $92C < T < 93C$

Before scan $E_{corr} = -293$ mV vs. SCE

$E_{oc} = -45$ mV vs. SCE

$T = 93C$

$93C < T < 94C$

Spec. General corrosion, etching.

No distinct soln. line on surface, so guessed as to level submerged

Estimated unimmersed length = 0.659 cm

Estimated ~~dp~~ "Actual" S.A. = 2.86 cm²

Soln. Some wintergreen hue to color. No precipitates.

calibration s.a.a.

0.094 pH / $24.9C$

DP 7/14/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP025
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.89
PASS
PASS
PASS
PASS

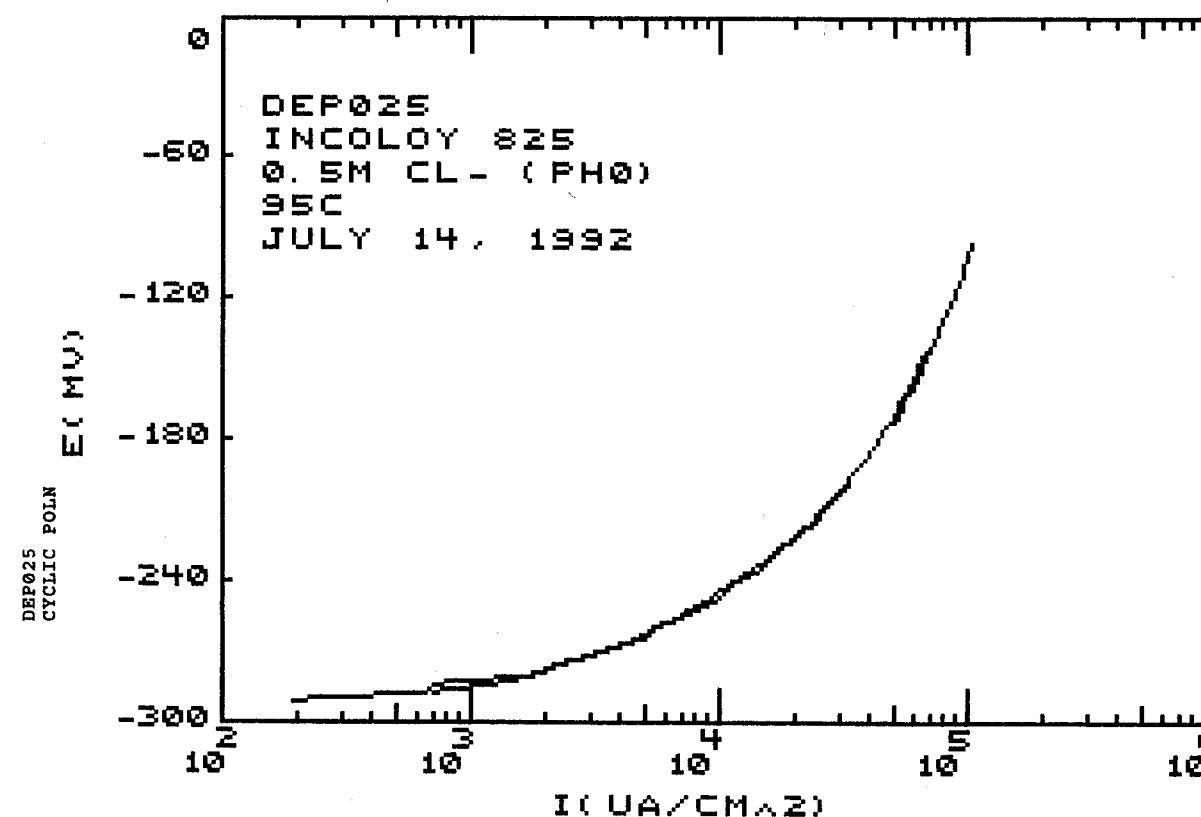
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-292
4
103460.2
-708.6505
189.6194
103460.2

LEGEND

DEP025 07/14/92
INCOLOY 825
HT HH4371FC
0.5M CL-
PH0
AR PURGE
95C



Donald L. Pile
7/14/92

Stock Soln 09 (0.5M Cl⁻)

58.44g reagent grade NaCl Fisher Lot No. 885407 & 917219 (Mettler)
added to H₂O to make 2L soln. DP 7/14/92

Test 026 DEPO26 - PILE1 disk

Buffers same as p. 62

7.02/21.7C 4.0/21.7C 1.0/21.7C
97.0% slope

600 ml Stock Soln. 09 (above) (0.5M Cl⁻) 5.920 pH/21.7C
added 65 ml conc. HCl Fisher Lot No. 920004 to bring to pH 13.4/24.5C

AISI 304L SS Ht. T0954

$\phi = 0.636$ cm $l = 1.901$ cm

Specimen immersed $\frac{2}{3}$ length by visual inspection into the soln.

Estimated S.A. = 2.85 cm²

Ar purge 1hr. Liquid carbonic Cylinder # RK3110

Spec. at O.C.P. 1hr. $92C < T < 94C$

Before scan $E_{corr} = -383$ mV vs. SCE

$E_{CE} = -126$ mV vs. SCE

$T = 94C$

$94C < T < 95C$

Spec. General Corrosion, black corrosion product covering surface.
Noticeable decrease of diameter at base (resembling a taper)
Unimmersed length = 0.615 cm although due to bubble
buildup on one side (0.338 cm above surface) corrosion
line irregular (not "level")
Estimated S.S.P. Actual S.A. = 3.22 cm²

Soln. No precipitates. Dark mint green color.

calibration s.a.a.

0.107 pH/24.7C

DP 7/15/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEPO26
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.85
PASS
PASS
PASS
PASS

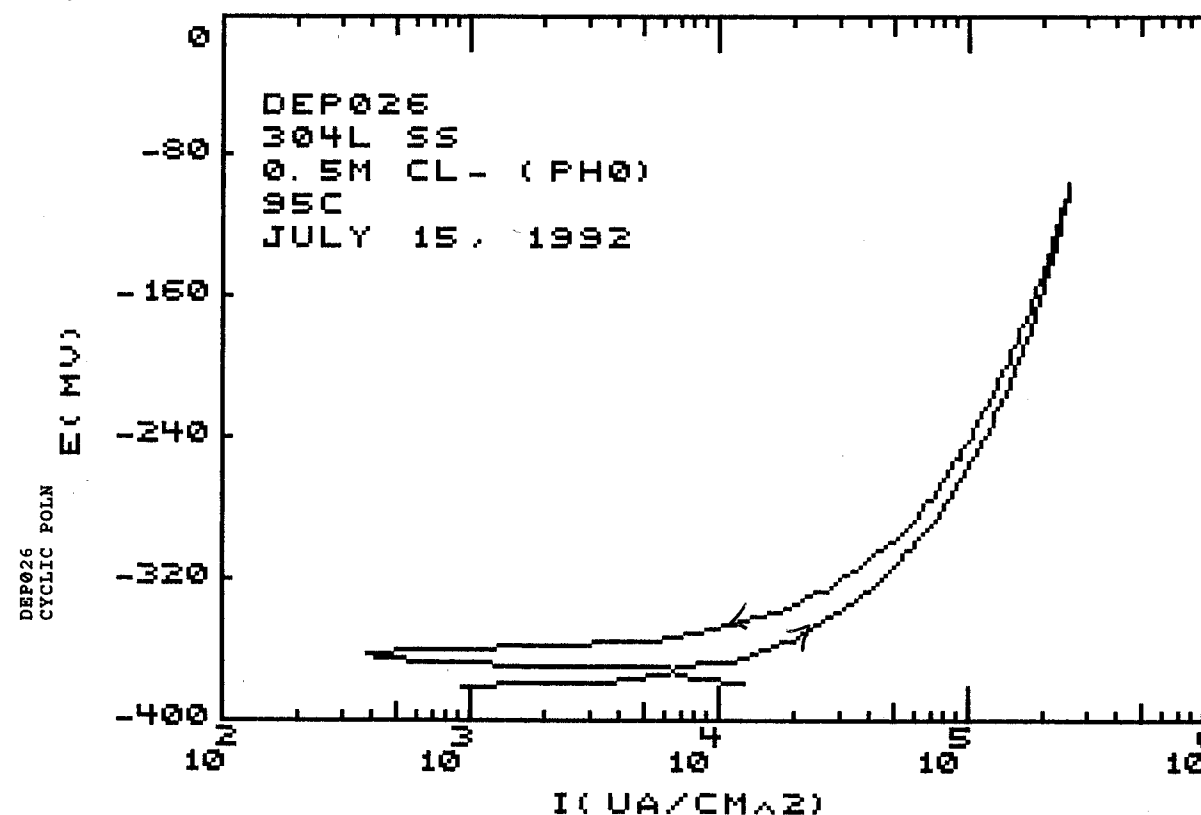
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-382
4
255087.7
-12385.96
378.9474
255087.7

LEGEND

DEPO26 07/15/92
AISI 304L SS
HT T0954
0.5M CL-
PH0
AR PURGE
95C



Donald L. Pile
7/15/92

Test 027 DEP027 - PILE 1 disk

pH calibration, using same buffers as p. 62

7.02/21.9C 4.00/21.8C 1.00/21.6C

96.2% slope

600 ml Stock Soln. 09 (0.5M Cl-) (p. 66) 5.915 pH/21.8C

added 3.5 ml conc. HCl to bring to pH 1.019 / 22.1C
Fisher Lot No. 920004

Incoloy 825 Ht. HH4371FC

 $\phi = 0.638$ cm $l = 1.910$ cmSpecimen immersed $\frac{2}{3}$ by visual inspectionEstimated S.A. = 2.87 cm²Test cell was heated by submersing/placing it in a water bath
(Fisher Isotemp Immersion Circulator) w/ the temperature control
set at 30°C, Temperatures ^{measured} (recorded) by a thermometer immersed
in test soln., as before, and ↓

Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. ^{2.25 hr.} ~~1 hr.~~ $T = 30^\circ\text{C}$ Before scan $E_{\text{corr}} = -272$ mV $E_{\text{CE}} = 451$ mV vs. SCE $T = 30^\circ\text{C}$ Spec. Etched, no pits.

Unimmersed length = 0.459 cm

Actual S.A. = 3.23 cm²Soln. Yellow hue to soln., no precipitates.

calibration S.A.A.

1.035 pH / ^{24.7} 25.0C

DP 7/16/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM^2)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)CYCLIC POLN
DEP027
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

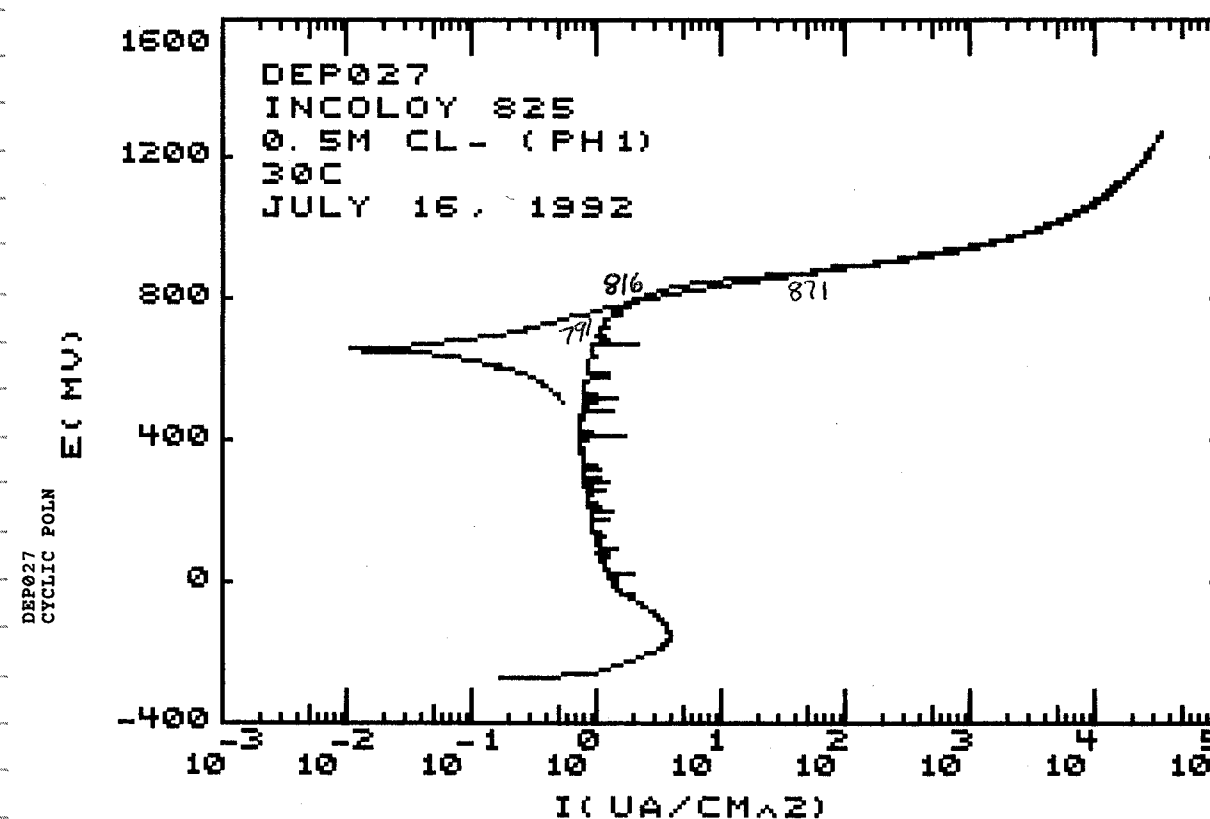
SAMPLE PARAMETERS

AREA(CMS^2)
EQ WT(GM)
DENSITY(GM/CM^3)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)2.87
PASS
PASS
PASS
PASS

DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX-269
4
34285.71
-5261324
0
34285.71

LEGEND

DEP027 07/16/92
INCOLOY 825
HT HH4371FC
0.5M CL-
PH1
AR PURGE
30CDonald L. Pile
7/16/92

Test 028 DEP028 - PILE 1 disk

pH calibration using same buffers listed on p. 62

7.02 / 20.5C 4.00 / 20.6C 1.00 / 21.0C

97.1 % slope

600 ml Stock soln. 0.9 (0.5M Cl-) (p.66) 5.908 pH / 20.8C

added 5.4 ml conc. HCl (Fisher Lot No. 920004) to bring to pH 1.076 / 21.4C

AISI 304L SS HT. T0954

 $\phi = 0.635$ cm $l = 1.904$ cmSpecimen immersed $\frac{2}{3}$ length by visual inspectionEstimated S.A. = 2.85 cm²

Test cell temp. maintained by heated water bath.

Ar purge 1 hr. Liquid Carbonic Cylinder #RK3110

Spec. at O.C.P. 1 hr. $T = 30^\circ\text{C}$ Before Scan $E_{\text{corr}} = -435$ mV vs. SCE $E_{\text{c.e.}} = 425$ mV vs. SCE $T = 30^\circ\text{C}$ $T = 30^\circ\text{C}$

Spec. Pitted.

Unimmersed length = 0.622 cm

Actual S.A. = 2.87 cm²

Soln. Very small hint of mint green color. No precipitates.

calibration s.a.a.

1.086 pH / 24.2C

DP 7/17/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP028
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.85
PASS
PASS
PASS
PASS

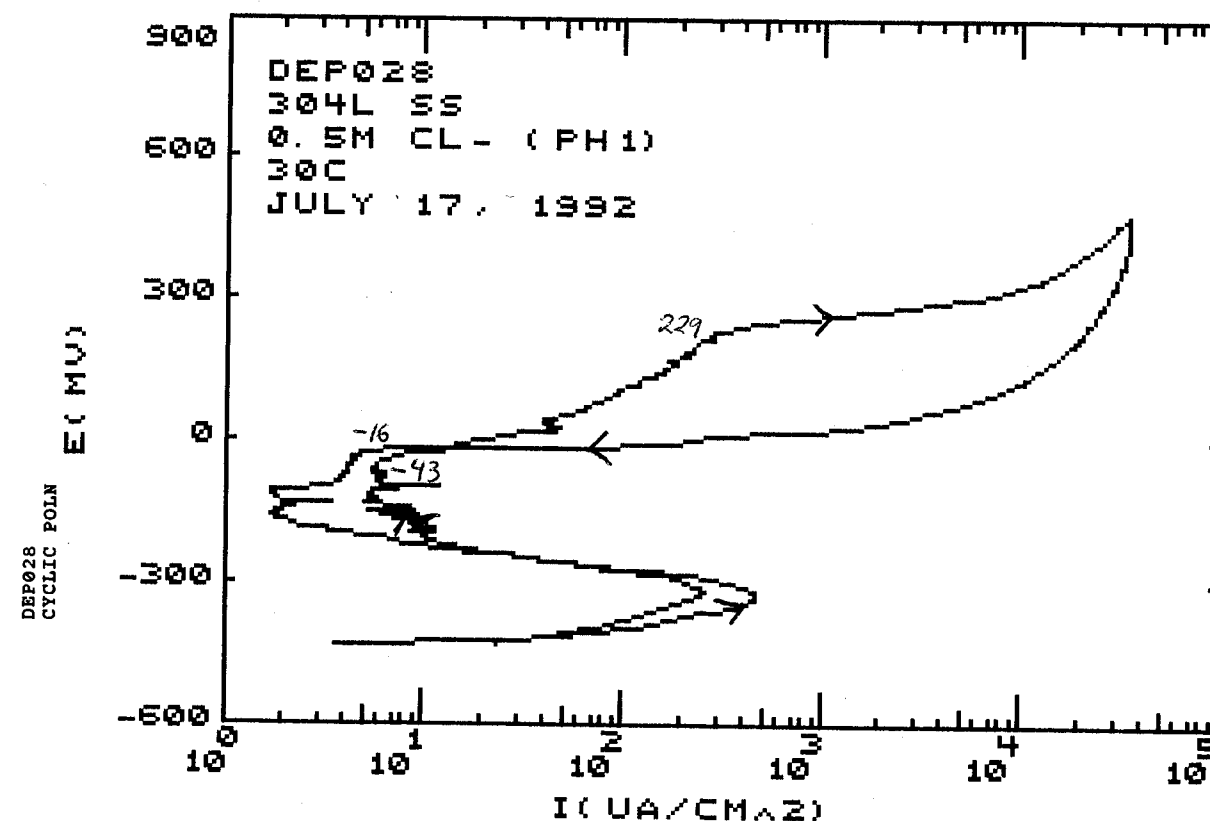
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-432
4
35403.51
-7.185965
1.71579
35403.51

LEGEND

DEP028 07/17/92
AISI 304L SS
HT T0954
0.5M CL-
PH1
AR PURGE
30C



Donald L. Pile
7/17/92

Dep 029

Stock Soln 10 (0.5MCl⁻)

58.43g reagent grade NaCl Fisher Lot No. 917219 (Mettler)
 added to 2.0 L H₂O

DP 7/17/92

Test 029 DEP029 - PILE1 disk

pH calibration using same buffers listed p. 62

7.03/19.8C 4.00/19.7C 1.00/20.2C

96.7% slope

600 ml Stock Soln 10 (0.5MCl⁻) above 6.099 pH/19.8C

added 50 ml conc. HCl Fisher Lot No. 920004 to bring to pH 17.6/22.3C

Incoloy 825 Ht. HH4371FC

 $\phi = 0.638$ cm $l = 1.917$ cmSpec. immersed $\frac{3}{4}$ length by visual inspectionEstimated S.A. = 2.88 cm²

Test cell temp. maintained by heat bath.

Ar purge 1.25 hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr. $T = 30^\circ\text{C}$ Before scan $E_{\text{corr}} = -285$ mV vs. SCE $E_{\text{ce}} = 435$ mV vs. SCE Graphite $T = 30^\circ\text{C}$ throughout test

Spec. Etched.

Unimmersed length = 0.495 cm

Actual S.A. = 3.17 cm²

Spec. pp

Soln. Yellowish-golden tan color. No precipitates.

Calibration s.a.a.

0.173 pH/25.1C

DP 7/20/92

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E (MV)
 VERTEX E (MV)
 FINAL E (MV)
 SCAN RATE (MV/S)
 THRESHOLD I (UA/CM²)
 CONDITION E (MV)
 CONDITION T (S)
 INIT DELAY (MV/S OR S)

CYCLIC POLN
 DEP029
 0 VS E
 -100 VS R
 0 VS E
 .17
 33000
 PASS
 PASS
 PASS

SAMPLE PARAMETERS

AREA (CMS²)
 EQ WT (GM)
 DENSITY (GM/CM³)
 CATHODIC TAFEL (MV)
 ANODIC TAFEL (MV)

2.88
 PASS
 PASS
 PASS
 PASS

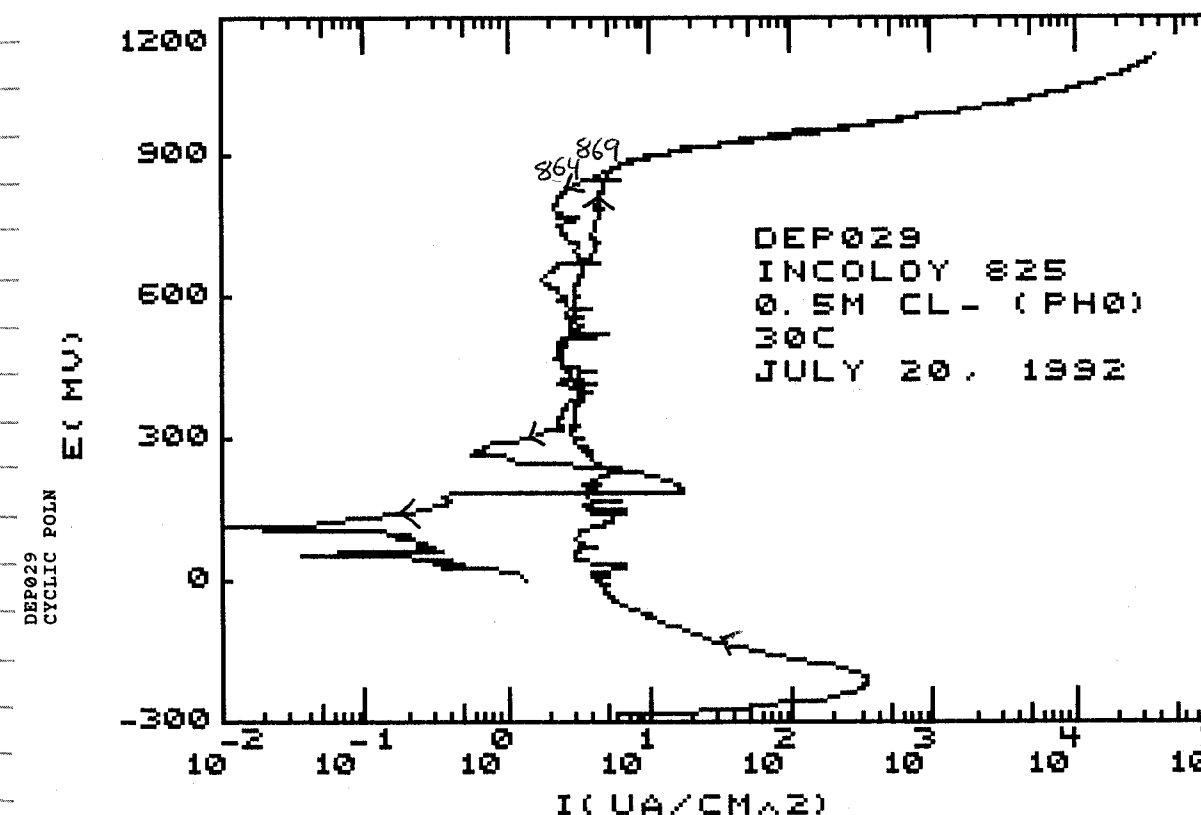
DATA SCALE

ECORR
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-284
 4
 36701.39
 -711.1111
 1.041667E-02
 36701.39

LEGEND

DEP029 07/20/92
 INCOLOY 825
 HT HH4371FC
 0.5M CL-
 PH0
 AR PURGE
 30C



Donald L. Pile

7/20/92

Test 030 DEPO30 - PILE1 disk

pH calibration same as p.72

600 ml stock soln. 10 (0.5MCl-) see p.72 6.036 pH/21.9C

added 60 ml conc. HCl (Fisher Lot No. 920004) to bring to 0.124 pH/24.7C
DP 7/20/92

AISI 304L SS HT. T0954

 $\phi = 0.636 \text{ cm}$ $l = 1.904 \text{ cm}$ Spec. immersed $\frac{2}{3}$ length by visual inspectionEstimated S.A. = 2.85 cm^2

Temp. maintained by heat bath. (30°C)

Ar purge 16.25 hr. Liquid Carbonic cylinder # RK3110

Spec. at O.C.P. 1hr. 30C

Before scan $E_{\text{corr}} = -429 \text{ mV vs. SCE}$ $E_{\text{c.e.}} = 386 \text{ mV vs. SCE}$ Graphite $T = 30C$ Spec. Etched, and no pits.

Unimmersed length = 0.394 cm

Actual S.A. = 3.33 cm^2 Soln. Slight green color, no precipitates

pH meter calibration

Buffer soln pH 7.00 Fisher Lot No. 913828-24 7.02/21.9C

" 4.00 " 922046-24 4.00/21.6C

" 1.00 " 913288-18 1.00/21.8C

96.9% slope

0.105 pH/21.6C

DP 7/21/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM^2)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEPO30
0 VS E
-100 VS R
0 VS E
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS^2)
EQ WT(GM)
DENSITY(GM/CM^3)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.85
PASS
PASS
PASS
PASS

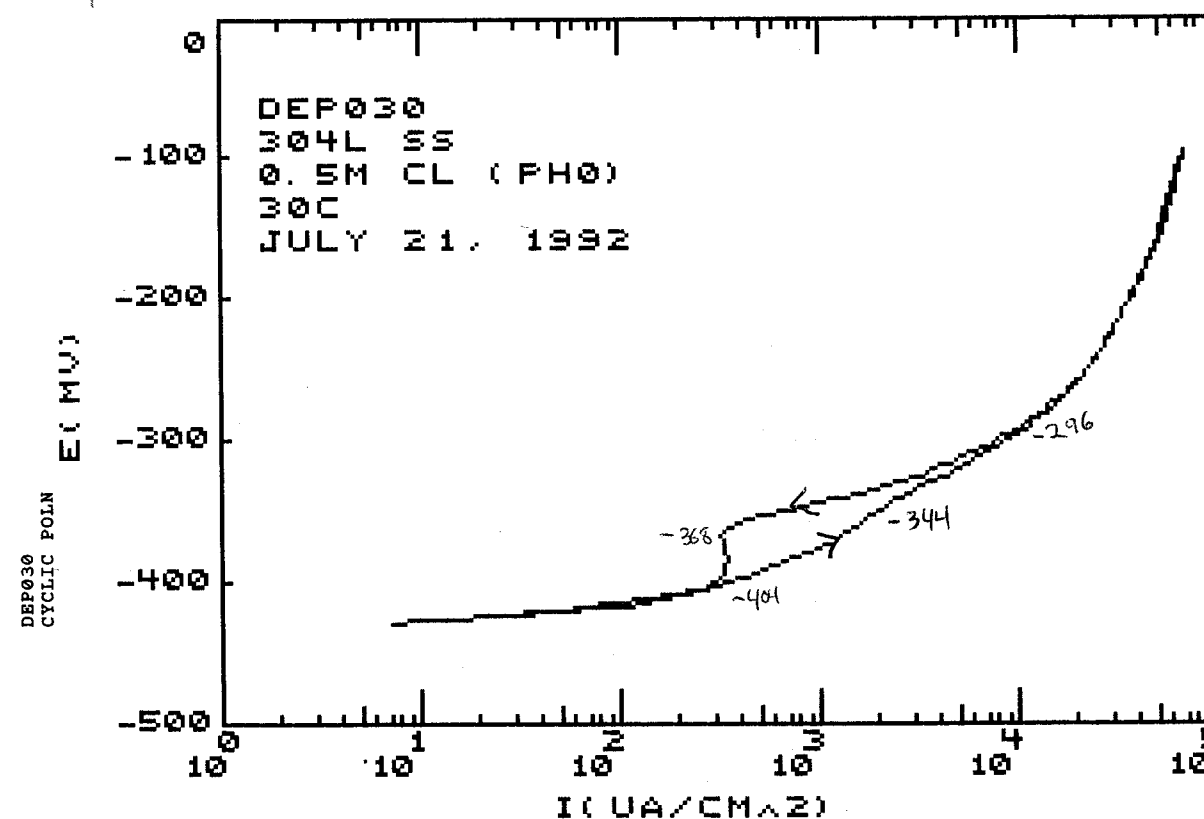
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-428
4
66666.67
-71.85965
7.147368
66666.67

LEGEND

DEPO30 07/21/92
AISI 304L SS
HT T0954
0.5M CL-
PH0
AR PURGE
30C



Donald L. Pua
7/21/92

Soln 11 ($3M Cl^- + 0.25M SO_4^{2-}$)

350.63g NaCl Fisher Lot No. 917219

71.05g Na_2SO_4 " 901213

added to Nanopure® Water to make 2L soln.

DP 7/21/92

Test 031 DEP031 - PILE1 disk

600 ml Stock Soln 11 ($3M Cl^- + 0.25M SO_4^{2-}$) see above

7.950 pH / 23.2C (calibration bottom p.74)

added 15 ml 2N HCl soln (see p.38) to bring to pH 1.024 / 23.1C

DP 7/21/92

Incoloy 825 Ht. HH34p HH4371FC

$\phi = 0.640$ cm $l = 1.923$ cm

Specimen immersed $\frac{2}{3}$ length into soln.

Estimated S.A. = 2.90 cm²

Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr. $94C < T < 95C$

Before scan $E_{corr} = -278$ mV vs. SCE

$E_{c.e.} = 270$ mV vs. SCE Graphite

$T = 95C$

Spec. Pitted.

Unimmersed length = 0.641 cm

Actual S.A. = 2.90 cm²

Soln. pH calibration Buffer 7.00 Fisher Lot No. 913828-24

" 10.00 " 913908-24

" 1.00 " 913288-18

99.9% slope

1069 pH / 23.7C

Blue mint color.

DP 7/22/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP031
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.9
PASS
PASS
PASS
PASS

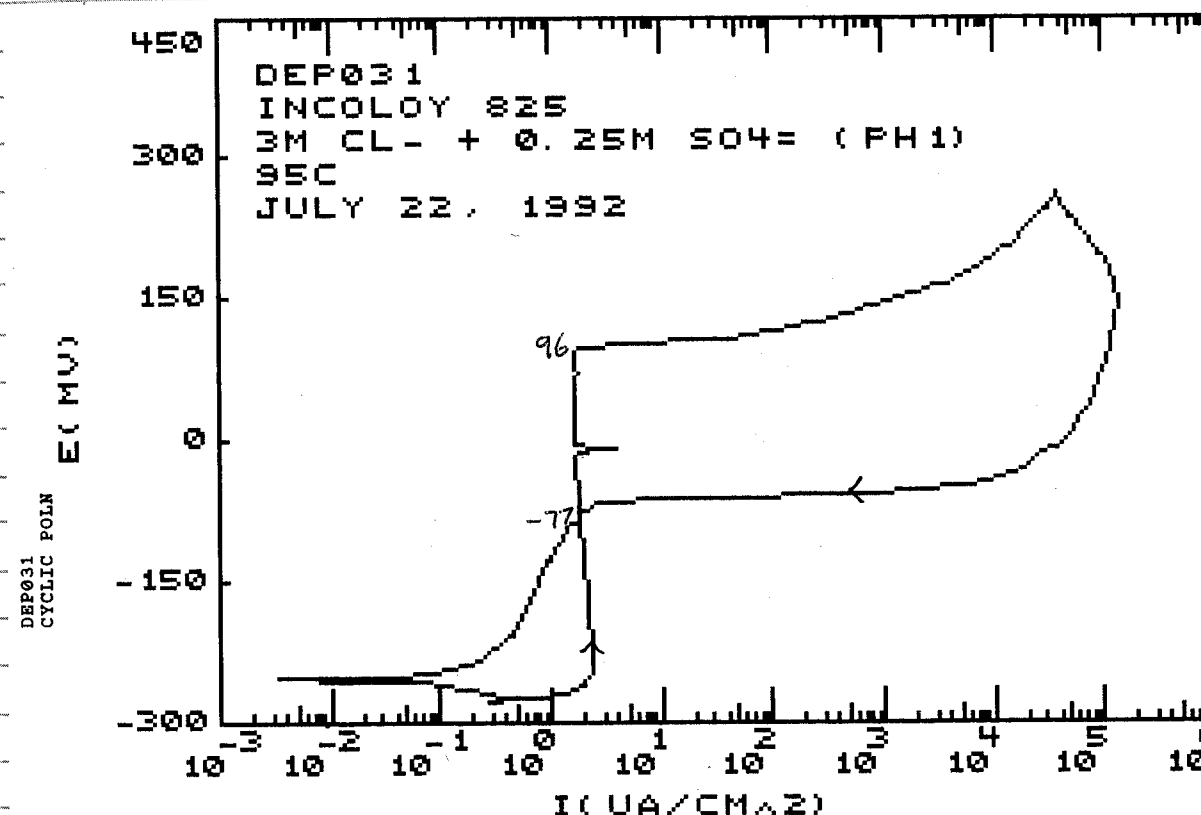
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-277
4
132758.6
-70.62069
3.448276E-03
132758.6

LEGEND

DEP031 07/22/92
INCOLOY 825
HT HH4371FC
3M CL- + 0.25M SO4-
PH1
AR PURGE
95C



Donald L. Pile
7/22/92

Test 032 DEPO32 - PILE2 disk600 ml stock soln. (3MCl + 0.25M SO₄²⁻) see top p.76

7.988 pH / 23.8C (calibration bottom p.74)

added 0.3 ml 2N HCl soln (see p.38) to bring to pH 2.985 / 23.8C

DP 7/21/92

AISI 304L SS HT0954

 $\phi = 0.636$ cm $l = 1.906$ cmSpecimen immersed $\frac{2}{3}$ length into soln.Estimated S.A. = 2.86 cm²

Ar purge 1 hr. Liquid Carbonic Cylinder # 466156

Specimen at O.C.P. 1 hr. 90C < T < 94C

Before scan $E_{corr} = -438$ mV vs. SCE $E_{c.e.} = 353$ mV vs. SCE

T = 94C

93C < T < 94C for test duration

Thermometer: Fisher Brand Tag No. 1238001

Potentiostat: EG & G Princeton Applied Research Model 273

Serial No. 41108

Sat'd NaCl bridge

Spec. Pitted.

Unimmersed length = 0.707 cm

Actual S.A. = 2.71 cm²Soln. pH calibration (see bottom p.76)

4.980 pH / 23.0C

Soln. brown/green w/ greenish precipitates. Whatman paper filtered.

DP 7/22/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEPO32
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.86
PASS
PASS
PASS
PASS

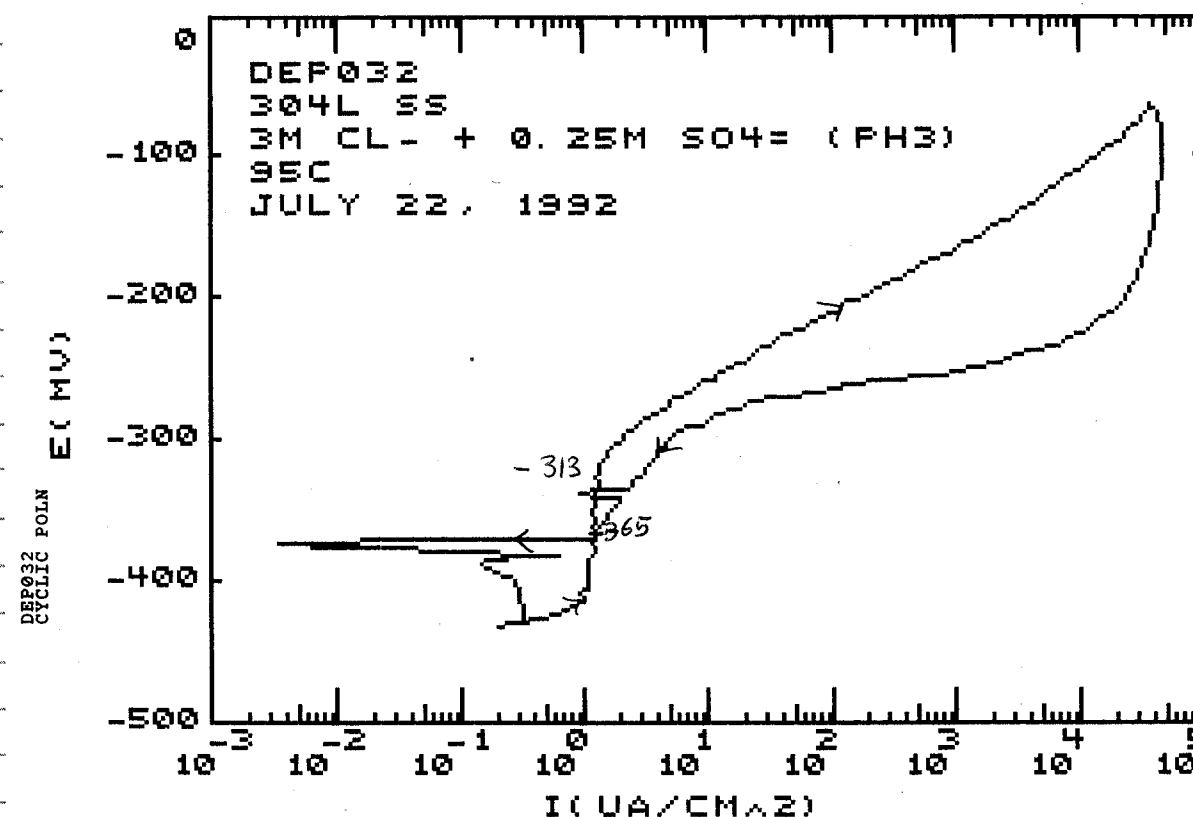
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-433
4
47622.38
-3146853
3.496504E-03
47622.38

LEGEND

DEPO32 07/22/92
AISI 304L SS
HT T0954
3M CL- + 0.25M SO4-
PH3
AR PURGE
95C



Donald L. Pile
7/22/92

Test 016R DEPO16R - PILE1 disk

pH meter calibration:

Buffersoln. pH 7.00 Fisher Lot No. 913828-24 7.03 / 20.5C

" 4.00 " 922046-24 4.00 / 21.1C

" 1.00 " 913288-18 1.00 / 21.1C

96.9% slope

600 ml 4MCl- soln (stock soln 07, p. 53) 6.560 pH / 20.6C

added 3.9 ml 2N HCl soln (p. 38) to bring to pH 1.012 / 20.8C

AISI 316L SS HT. P80746

 $\phi = 0.634 \text{ cm}$ $l = 1.907 \text{ cm}$ Specimen immersed $\frac{2}{3}$ length into soln.Estimated S.A. = 2.85 cm^2

Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr. $93C < T < 95C$ Before scan $E_{\text{corr}} = -393 \text{ mV vs. SCE}$ $E_{\text{CE}} = 99 \text{ mV vs. SCE}$ Graphite $T = 94C$ $T = 94C$ for duration of testSpec. Pitted; dark corrosion product on surfaceUnimmersed length = 0.640 cm Actual S.A. = 2.84 cm^2 Soln A little green color to soln. No precipitates.

pH calibration s.a.a.

1.398 pH / 24.1C

DP 7/23/92

(See pages 45+46 for comparison)

7/29/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM^2)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEPO16R
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS^2)
EQ WT(GM)
DENSITY(GM/CM^3)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.85
PASS
PASS
PASS
PASS

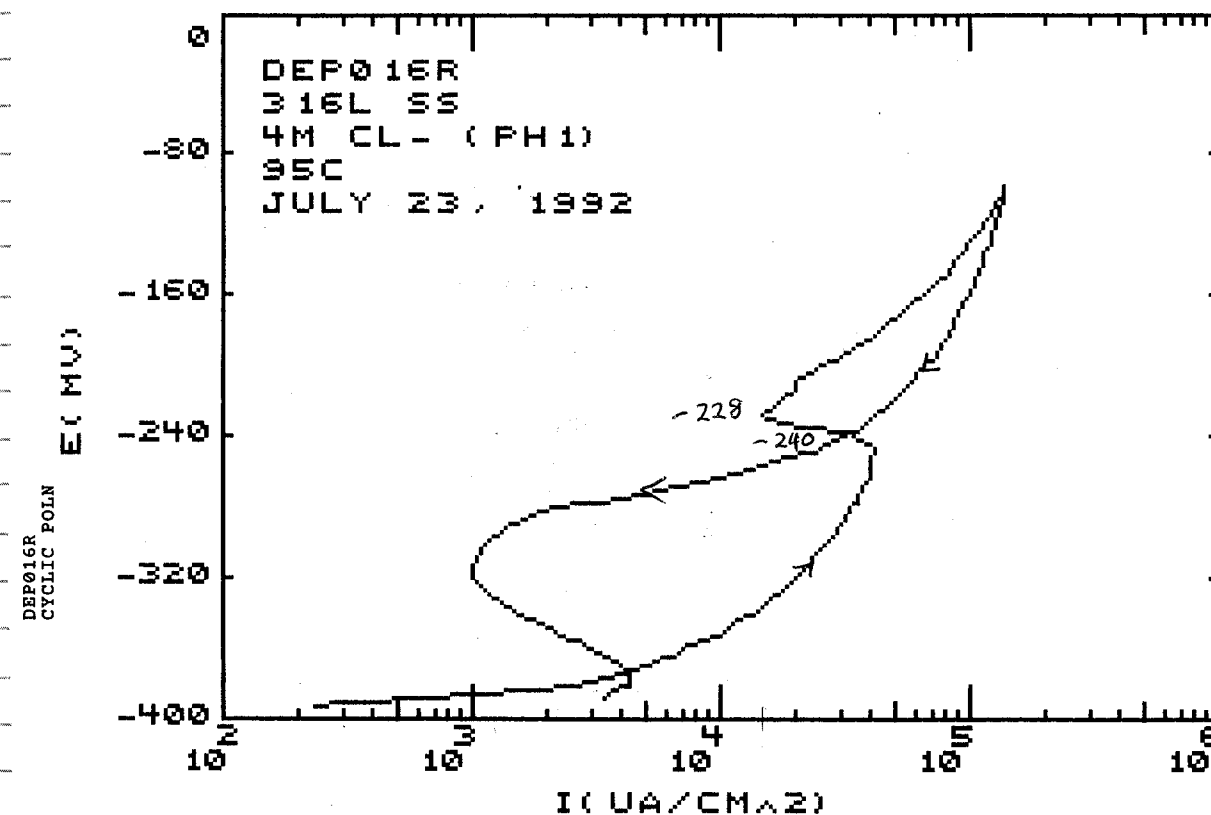
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-392
4
137543.9
-7185.965
230.8772
137543.9

LEGEND

DEPO16R 07/23/1992
AISI 316L SS
HT P80746
4M CL-
PH1
AR PURGE
95C



Donald L. Pile
7/23/92

Test 033 DEPO33 - PILE1 disk

pH meter calibration:

same buffers as those listed p. 80

7.03 / 20.8C 4.00 / 21.5C 1.00 / 21.2C 96.8% slope

Soln: 600 ml 3HCl + 0.25M SO₄²⁻ Soln (Stacks Soln #1) ^{p. 76} 6.855 pH / 20.7C
added 25.0 ml conc. HCl (Fisher Lot No. 920004) to bring to pH 0.036 / 21.7C

Spec: Incoloy 825 Ht. HH4371FC
 $\phi = 0.637$ cm $l = 1.911$ cm
Spec. immersed $\frac{2}{3}$ length by visual inspection.
Estimated S.A. = 2.87 cm²

Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110
Spec. at O.C.P. 1 hr. 93C < T < 95C
Before scan $E_{corr} = -291$ mV vs. SCE
 $E_{CE} = 148$ mV vs. SCE Graphite
T = 95C

94C < T < 96C for test duration

Spec: Etched, no pits.
Unimmersed length = 0.690 cm
Actual S.A. = 2.76 cm²

Soln: A little green color. No precipitates.
pH calibration s.a.u.
0.028 pH / 24.3C

DP 7/24/92

UN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEPO33
0 VS E
-100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EO WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.87
PASS
PASS
PASS
PASS

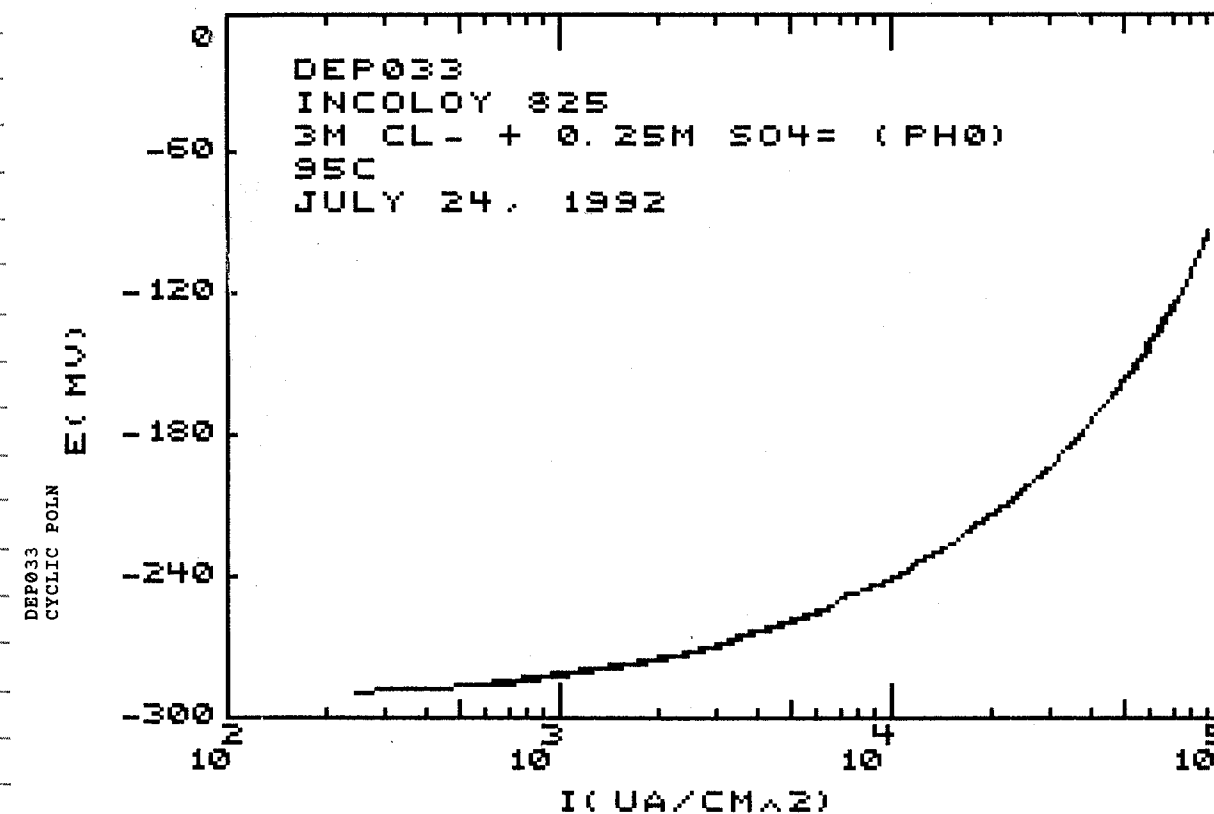
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-289
4
90243.91
-7135.889
241.4634
90243.91

LEGEND

DEPO33 07/24/92
INCOLOY 825
HT HH4371FC
3M CL- + 0.25M SO₄²⁻
PH0
AR PURGE
95C



Donald L. Pile
7/24/92

Stock Soln 12 (3MCl + 0.25M SO₄²⁻)

350.96g reagent grade NaCl Fisher Lot No. 917219 } Mettler
 71.21g " Na₂SO₄ " 901213 }
 added to Nanopure® water to make 2L soln.

DP 7/24/92

Test 034 DEPO34 - PILE1 disk

pH calibration: same buffers as those listed on p. 80

7.03/20.4C 4.00/20.6C 1.00/20.8C 96.8% slope

Soln: 600ml 3MCl + 0.25M SO₄²⁻ soln. (Stock Soln. 12, above) 8.600pH/20.5C
 added 15.5ml 2N HCl soln (p38) to bring to pH 1.028/20.4C

Spec: AISI 304L SS HT. T0954

Ø = 0.635cm l = 1.905cm

Spec. immersed 2/3 length by visual inspection.

Estimated S.A. = 2.85cm²

Ar purge 1hr. Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1hr. 93C < T < 95C

Before scan E_{corr} = -447 mV vs. SCE

E_{C.E.} = 226mV vs. SCE Graphite

T = 95C

95C < T < 97C for test duration

Spec: Pitted and etched.

Unimmersed length = 0.817cm

Actual S.A. = 2.49cm²

Soln: Slight green color; no precipitates.

pH calibration s.a.a.

1.028 pH/22.1C

DP 7/27/92

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E(MV)
 VERTEX E(MV)
 FINAL E(MV)
 SCAN RATE(MV/S)
 THRESHOLD I(UA/CM²)
 CONDITION E(MV)
 CONDITION T(S)
 INIT DELAY(MV/S OR S)

CYCLIC POLN
 DEPO34
 0 VS E
 -100 VS R
 0 VS E
 .17
 33000
 PASS
 PASS
 PASS

SAMPLE PARAMETERS

AREA(CMS²)
 EQ WT(GM)
 DENSITY(GM/CM³)
 CATHODIC TAFEL(MV)
 ANODIC TAFEL(MV)

2.85
 PASS
 PASS
 PASS
 PASS

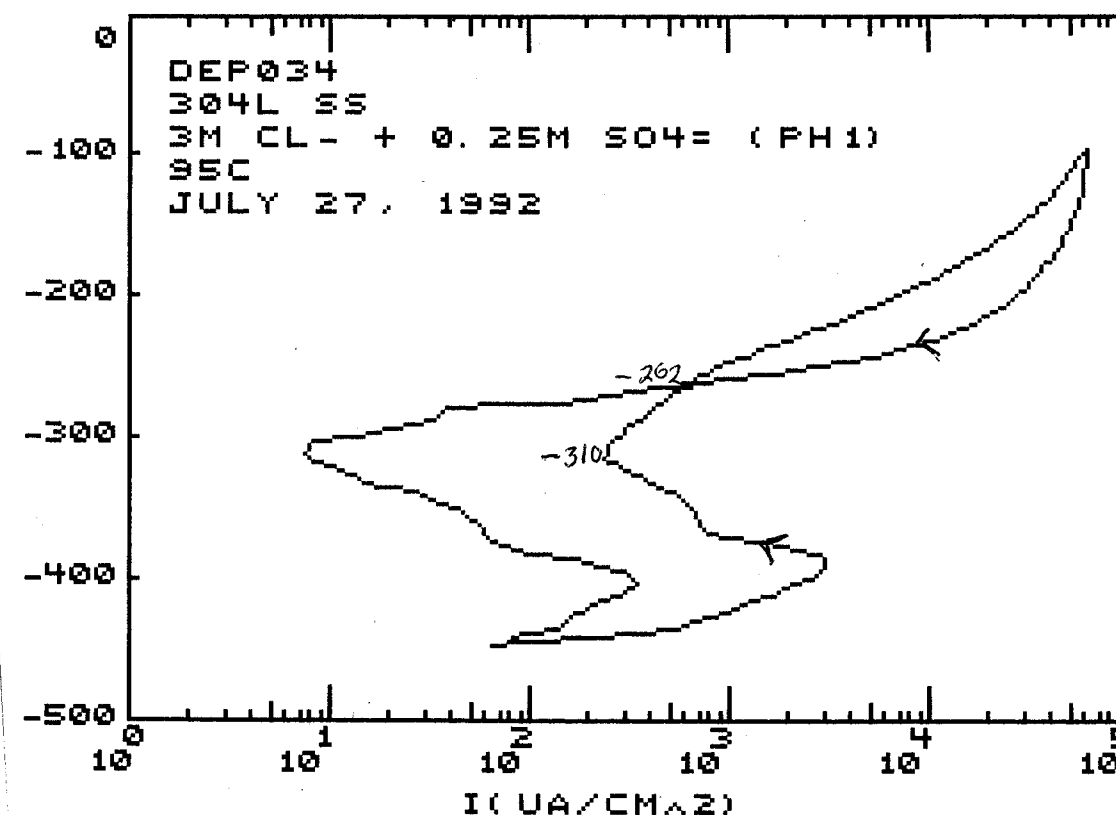
DATA SCALE

ECORR
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-446
 4
 61263.16
 7.54386
 7.54386
 61263.16

LEGEND

DEPO34 07/27/92
 AISI 304L SS
 HT T0954
 3M CL- + 0.25M SO4-
 PH1
 AR PURGE
 95C



Donald L Pile
 7/27/92

Test 035 DEP035 - FILE1 disk

pH meter calibration: same buffers as those listed p. 80

7.03 / 20.7 C 4.00 / 20.6 C 1.00 / 20.5 C 96.9 % slope

Soln: 600 ml 3M Cl⁻ + 0.25M SO₄²⁻ soln. (Stock soln (2, p. 84) 8.083 pH / 20.0 C
added 15.1 ml 2N HCl soln. (p. 38) to bring to pH 1.030 / 20.0 C

Spec: Incoloy 825 HT. HH4371 FC

 $\phi = 0.643$ cm $l = 1.922$ cmSpec. immersed $\frac{2}{3}$ length into soln.Estimated S.A. = 2.91 cm²

Ar purge 1 hr. Liquid Carbonic cylinder # RK3110

Temperature maintained by (water) heat bath 30C throughout test

Spec. at O.C.P. 1 hr.

Before scan $E_{\text{corr}} = -291$ mV vs. SCE $E_{\text{O.C.P.}} = 441$ mV vs. SCE Graphite $T = 30$ C

Spec: Etched, no pits.

Unimmersed length = 0.653 cm.

Actual S.A. = 2.87 cm²

Soln: Yellowish color; no precipitates.

pH calibration s.a.a.

1.095 pH / 24.6 C

DP 7/28/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP035
0 VS E
0 VS R
0 VS E
17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.91
PASS
PASS
PASS
PASS

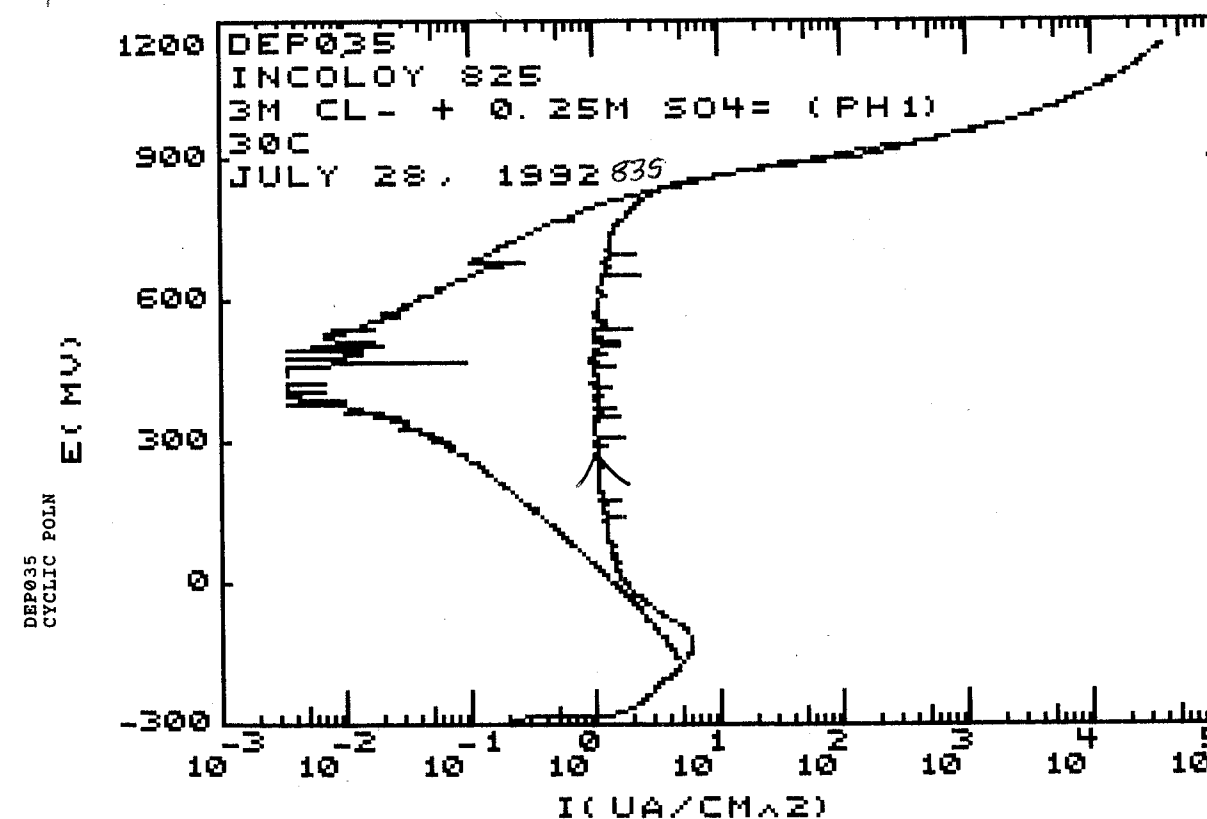
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-290
4
36426.12
-4.491409
0
36426.12

LEGEND

DEP035 07/28/92
INCOLOY 825
HT HH4371FC
3M CL- + 0.25M SO4-
PH1
AR PURGE
30C



Donald J. Pike

7/28/92

Test 036 ^{2nd} DEP036 - PILE disk

pH meter calibration: same buffers as on p. 80

7.03/20.1C 4.00/20.3C 1.00/20.5C 96.7% slope

Soln: 600 ml 3M Cl⁻ + 0.25M SO₄²⁻ soln. (Stock soln. 12, p. 84) pH 7.746/20.0C
added 15 ml 2N HCl soln (p. 38) to bring to pH 1.034/20.0C

Spec: AISI 304L SS, Ht. T0954

$\phi = 0.636$ cm $l = 1.904$ cm

Spec. immersed $\frac{2}{3}$ length by visual inspection.

Estimated S.A. = 2.85 cm²

Temperature maintained by constant-temp. bath. @ 30C

Ar purge 1 hr. Liquid Carbonic Cylinder # RK3110

Spec. at o.c.p. 1 hr.

Before scan $E_{corr} = -465$ mV vs. SCE

$E_{c.e.} = 417$ mV vs. SCE Graphite

T = 30C

Spec: Pitted.

Unimmersed length = 0.454 cm

Actual S.A. = 3.21 cm²

Soln: Very slight hint of green color. No precipitates

pH calibration s.a.a.

pH 1.082/22.6C

DP 7/29/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP036
0 VS E
0 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.85
PASS
PASS
PASS
PASS

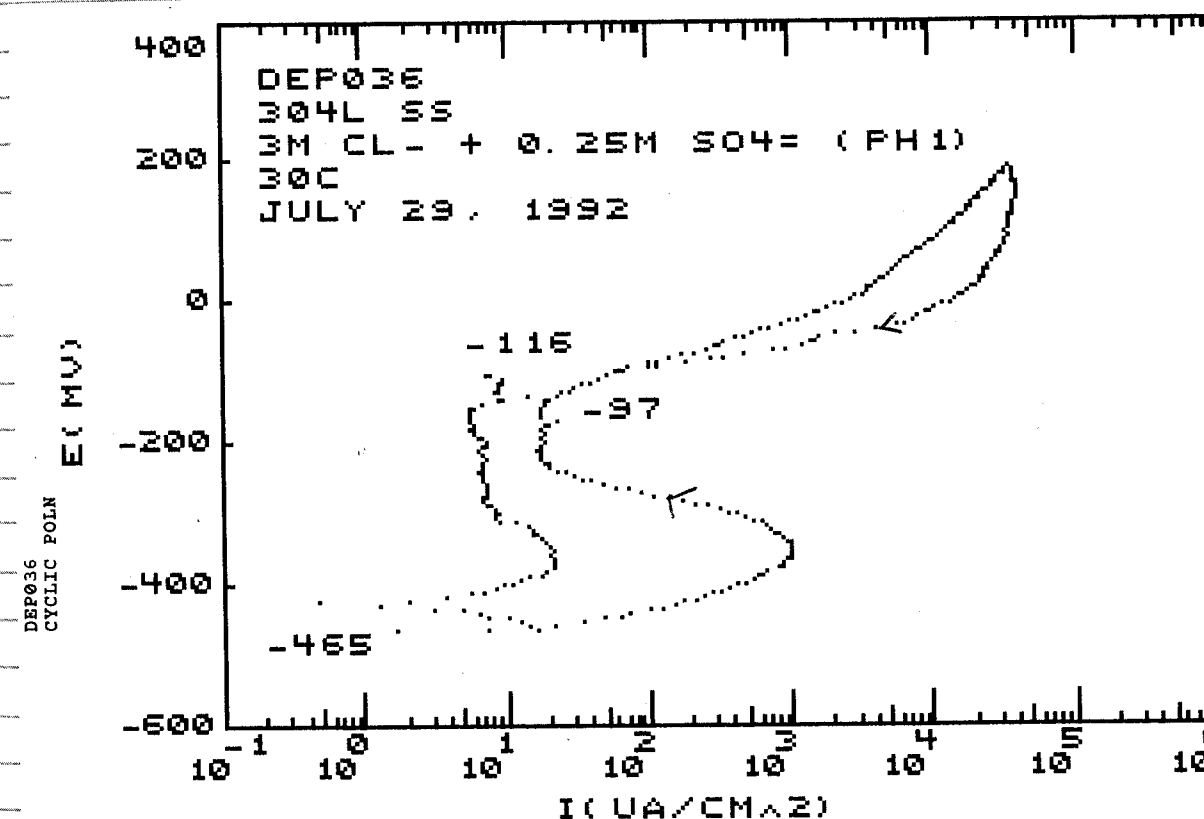
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-465
4
39824.56
-16.66667
.4736842
39824.56

LEGEND

DEP036 07/29/92
304L SS
HT T0954
3M CL- + 0.25M SO₄⁻
PH1
AR PURGE
30C



Donald L. Pile
7/29/92

Soln. 13 (~~3MCl + 0.25M SO₄²⁻~~) DP (4MCl-)

467.51g reagent grade NaCl Fisher Lot No. 917219 }
~~Na₂SO₄~~ 901213 DP } Mettler

added to Nanopure[®] Water to make 2L soln.

DP 7/29/92

Test 018R DEPO18R - PILE1 disk

pH meter calibration: same buffers as listed p.80

7.03/20.3C 4.00/20.6C 1.00/20.5C 96.9% slope

Soln: 600ml 4MCl- soln. (stock soln. 13, above) 8.150pH/20.0C

added 10.1ml conc. HCl (Fisher Lot No. 920004) to bring to pH 0.059/20.5C

Spec: Incoloy 825 Ht. HH4371FC

Ø = 0.637 L = 1.917

Specimen immersed $\frac{2}{3}$ length by visual inspection

Estimated S.A. = 2.87cm²

Ar purge 1hr Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1hr. 10 min 95C < T < 96C

Before scan E_{corr} = -289mV vs. SCE

E_{C.E.} = 177mV vs. SCE Graphite

T = 95C

T = 95C throughout test

Spec: General corrosion. Observable mass loss. Tip tapers.

Unimmersed length = 0.680 cm

Actual S.A. = 2.79 cm²

Soln: Dark green (emerald color); no precipitates; black flakes on bottom.

pH calibration s.a.a.

0.095 pH / 24.5C

DP 7/30/92

See p. 49 & 50 for comparison (DEPO18)

DP 8/3/92

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E (MV)
 VERTEX E (MV)
 FINAL E (MV)
 SCAN RATE (MV/S)
 THRESHOLD I (UA/CM²)
 CONDITION E (MV)
 CONDITION T (S)
 INIT DELAY (MV/S OR S)

CYCLIC POLN
 DEPO18R
 0 VS E
 300 VS R
 0 VS E
 .17
 35000
 PASS
 PASS
 PASS

SAMPLE PARAMETERS

AREA (CMS²)
 EQ WT (GM)
 DENSITY (GM/CM³)
 CATHODIC TAFEL (MV)
 ANODIC TAFEL (MV)

2.87
 PASS
 PASS
 PASS
 PASS

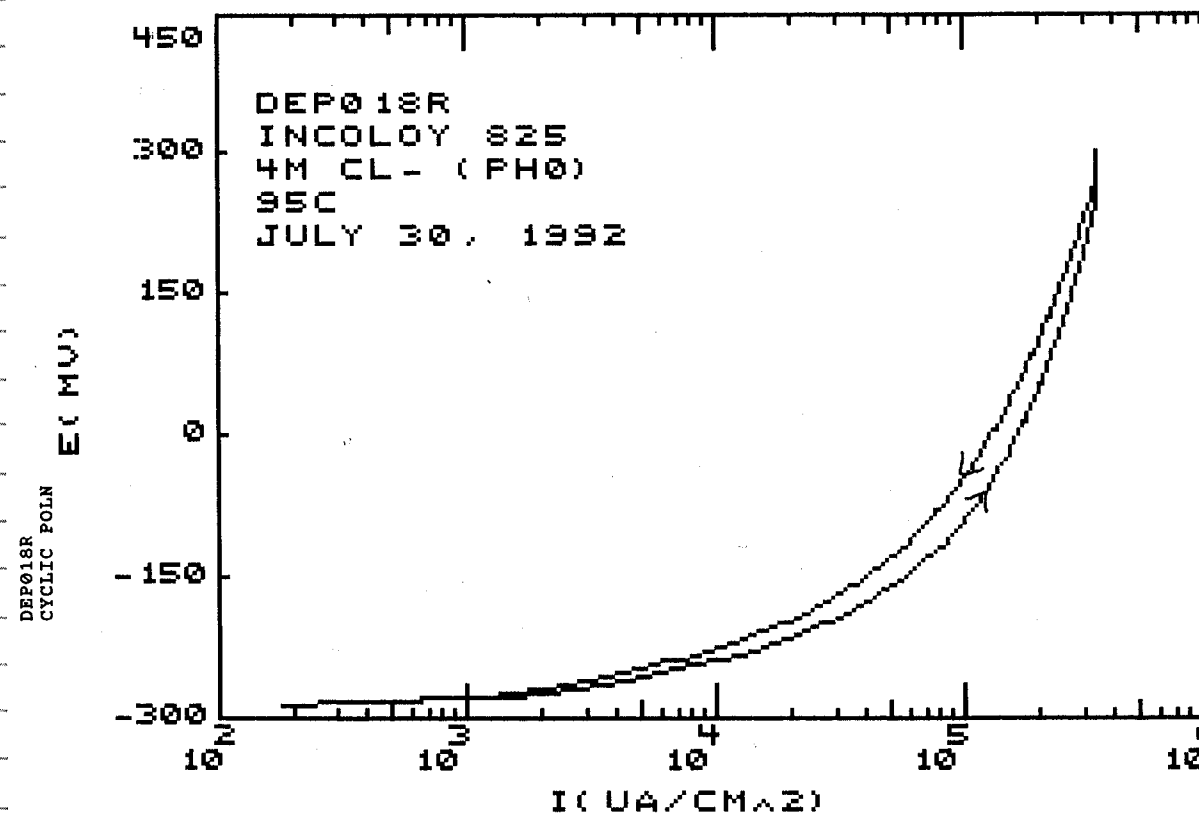
DATA SCALE

ECORR
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-288
 4
 338327.5
 -7135.889
 180.4878
 338327.5

LEGEND

DEPO18R 07/30/92
 INCOLOY 825
 HT HH4371FC
 4M CL-
 PH0
 AR PURGE
 95C



Donald L. Pile
 7/30/92

4M Cl Solution

DEP	Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	i peak	ipeak/ipas
5	304L	30	9.271	-488	-51	-484	4E-07	4E-07	1
10		30	5.504	-459	-219	-235	4E-06	8E-05	20
13		30	1.086	-461	-184	-213	7E-05	0.0025	35.71429
20		30	0.028	-426	Active	Active	Active	Active	ERR
6R		95	8.902	-745	-286	-529	1E-06	2E-06	2
9	316L	95	5.75	-405	-353		2E-06	2E-06	1
14		95	1.281	-434	Active	Active	Active	Active	ERR
7		30	9.288	-685	-48	-237	6E-07	1.5E-06	2.5
11		30	5.912	-436	-147	-288	2.5E-06	1.2E-05	4.8
15		30	1.044	-400	-176		3E-05	0.00035	11.66667
8	Alloy 825	95	8.79	-708	-187	-348	1E-06	2E-06	2
12		95	4.867	-345	-297	-325			ERR
16R		95	1.398	-392	-288	-240	0.015	0.04	2.666667
22		30	3.429	-323	770	757	1E-06	6E-06	6
19		30	0.008	-284	913	913	2E-05	0.0015	75
21	18R	30	-0.355	-287	Active	Active	Active	Active	ERR
17		95	1.064	-340	-39	-120	2E-05	0.004	200
18R		95	0.095	-288	Active	Active	Active	Active	ERR

0.5M Cl Solution

DEP	Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	i peak	ipeak/ipas
28	304L	30	1.086	-432	-43	-16	7E-06	0.0005	71.42857
30		30	0.105	-428	Active	Active	Active	Active	ERR
24		95	1.049	-406	-130	-145	0.0005	0.05	100
26	Alloy 825	95	0.107	-382	Active	Active	Active	Active	ERR
27		30	1.035	-269	816	791	1E-06	4E-06	4
29		30	0.173	-284	869	864	4E-06	0.0003	75
23		95	0.998	-301	248	19	8E-06	0.0005	62.5
25		95	0.094	-292	Active	Active	Active	Active	ERR

3M Cl + 0.25M SO4

DEP	Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	i peak	ipeak/ipas
36	304L	30	1.082	-465	-166	-97	2E-05	0.001	50
32		95	4.98	-433	-313	-365	1.2E-06	1.2E-06	1
34		95	1.028	-446	-310	-262	0.00025	0.003	12
35	Alloy 825	30	1.095	-290	835	835	1E-06	6E-06	6
31		95	1.069	-277	96	-77	2E-06	2E-06	1
33		95	0.028	-289	Active	Active	Active	Active	ERR

DEPASS 1. WQ 1

Depass disk

Donald L. Pile

8/4/92

The data from the tests preceding p. 92 were compiled and listed in table form on p. 92. It shows some relationships which are expected, e.g., i_{peak}/i_{pass} decreases w/ increasing pH; E_{break} is lower for higher temperatures;

Following are tests to fill in some gaps and add some new conditions.

Donald L. Pile 8/4/92

Test 037 DEP037 - PILE1 disk

pH meter Calibration

Buffer Soln. pH 7.00 Fisher Lot No. 913828-24 (7.03 / 20.9C)

" 4.00 " 922046-24 (4.00 / 20.9C)

" 1.00 " 913288-18 (1.00 / 20.7C)

95.8% slope

Soln: 600ml 4M CL⁻ (stock soln. 13, p. 90) pH 8.297 / 20.7C

added 0.15 ml 2N HCl (p. 38) to bring pH to 2.542 (20.7C)

Spec: Incoloy 825 HT. HH4371FC

 $\phi = 0.637$ cm $l = 1.905$ cmSpecimen immersed $\frac{2}{3}$ length by visual inspectionEstimated S.A. = 2.86 cm²Ar purge $1\frac{1}{4}$ hr Liquid Carbonic Cylinder # RK3110Spec. at O.C.P. 1 hr. $95C < T < 97C$ Before scan $E_{corr} = -323$ mV vs. SCE $E_{CE} = 126$ mV vs. SCE Graphite $T = 95C$ $T = 95C$ for test duration

Spec: Pitted; goldish/brown film on lateral surface; some general corrosion on base.

Unimmersed length = 0.740 cmActual S.A. = 2.65 cm²

Soln: Brown precipitates (began forming as higher currents were reached.)

Filtered w/ Fisher Brand Coarse Filter Paper.

 7.427 pH / $24.8C$

AP 8/10/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP037
0 VS E
100 VS R
0 VS E
17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.86
PASS
PASS
PASS
PASS

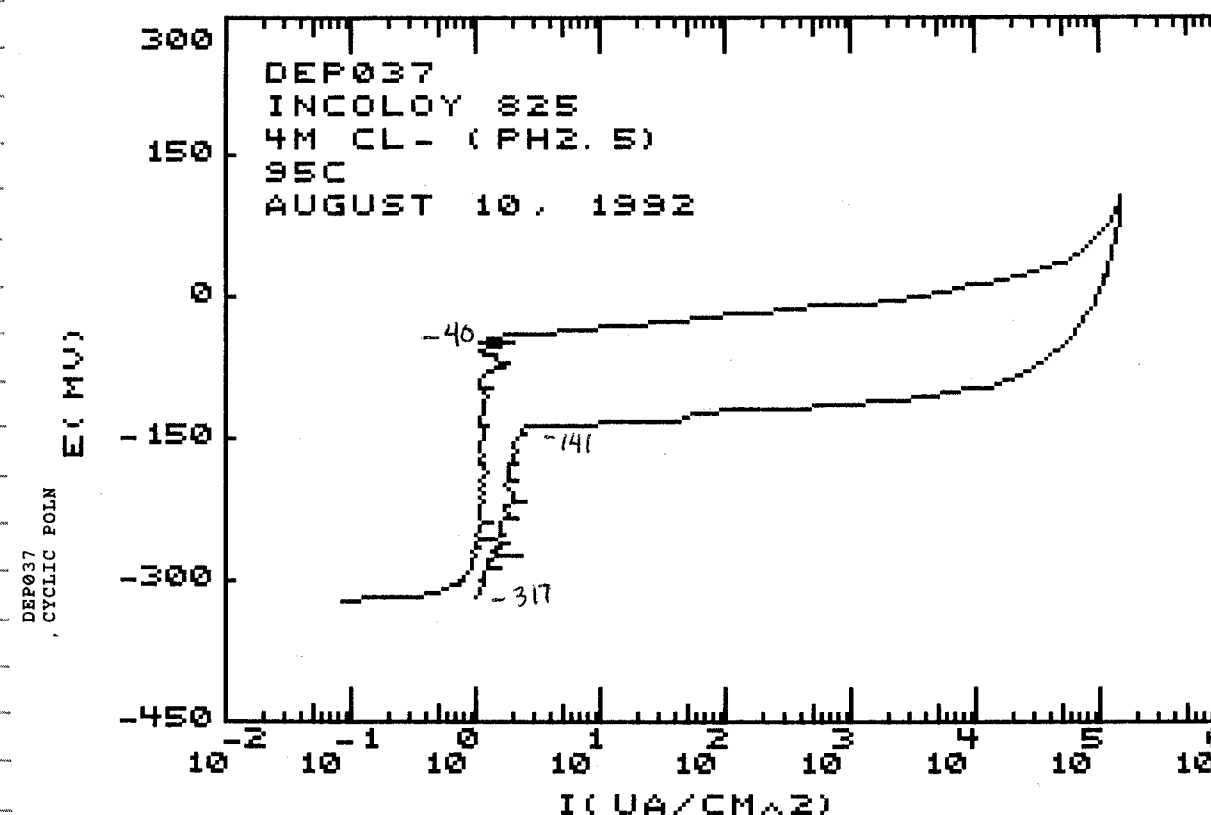
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-321
4
151049
-71608.39
8.881119E-02
151049

LEGEND

DEP037 08/10/92
INCOLOY 825
HT HH4371FC
4M CL⁻
PH2.5
AR PURGE
95C



Donald L. Pile
8/10/92

Test 038 DEP038 - PILE2 disk

pH meter calibration same as on p. 94

Soln: 600 ml 4MCL- (Stock Soln. 13, p. 90) pH 8.238 / 21.1C

Spec: Incoloy 825 Ht. HH4371 FC

$\phi = 0.640$ cm $l = 1.918$ cm

Specimen immersed $\frac{2}{3}$ length by visual inspection

Estimated S.A. = 2.89 cm²

Ar purge $\frac{1}{3}$ hr Liquid Carbonic Cylinder # 466156

Spec. at O.C.P. 1 hr $T = 95^\circ\text{C}$ Thermometer:

Before scan $E_{\text{corr}} = -627$ mV vs. SCE

$E_{\text{CE}} = -27$ mV vs. SCE Platinum foil

$T = 95^\circ\text{C}$

$T = 95^\circ\text{C}$ for test duration

Potentiostat: EG & G Princeton Applied Research Model 273

Serial No. 41108

Spec: Pitted; goldish/brown film.

Unimmersed length = 0.846 cm

Actual S.A. = 2.48 cm²

Soln: Reddish/brown precipitates.

Filtered w/ Fisher Brand Coarse Filter Paper

8.174 pH / 24.0C

DP 8/10/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP038
0 VS E
100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.89
PASS
PASS
PASS
PASS

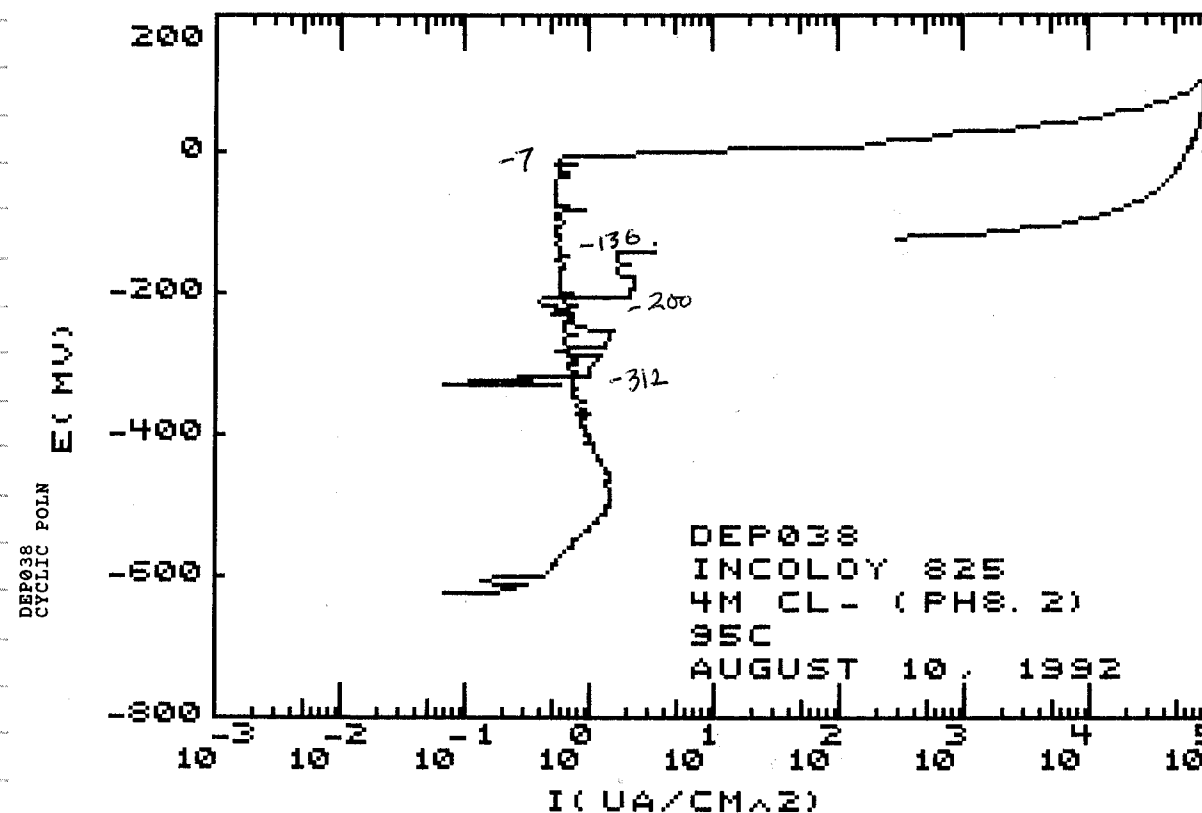
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-624
4
87543.25
-3.460207
0
87543.25

LEGEND

DEP038 08/10/92
INCOLOY 825
HT HH4371
4M CL-
PH8.2
AR PURGE
95C



Donald L. Pile
8/10/92

Soln. 14 (4M Cl⁻)

467.50g NaCl Fisher Lot No. 917219 } Mettler

added to Nanopure Water to make 2.0L soln.

DP 8/10/92

Test 039 DEPO39 - FILE 1 disk

pH meter calibration: buffers listed p. 94

7.03/20.3 C 4.00/20.8 C 1.00/20.7 C

96.7% slope

Soln: 600 ml 4M Cl⁻ (Stock soln. 14, above) 8.333 pH/20.2 C

added 0.08 ml 2N HCl soln (p. 38) to bring to pH 2.911/20.2 C

Spec: Incoloy 825 HT. HH4371 FC

$\phi = 0.639$ cm $\ell = 1.920$ cm

Specimen immersed $\frac{2}{3}$ length by visual inspection

Estimated S.A. = 2.89 cm²

Ar purge $1\frac{1}{4}$ hr + $\frac{1}{2}$ hr Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 hr. $62^{\circ}\text{C} < T < 67^{\circ}\text{C}$

Before scan $E_{\text{corr}} = -337$ mV vs. SCE

$E_{\text{c.e.}} = 289$ mV vs. SCE

$T = 68^{\circ}\text{C}$

Graphite

Spec: Pitted

Unimmersed length = 0.768 cm

Actual S.A. = 2.63 cm²

Soln: Reddish/brown precipitates

Filtered w/ Fisher Brand Filter Paper (coarse)

5.230 pH/24.4 C

DP 8/11/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEPO39
0 VS E
100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.89
PASS
PASS
PASS
PASS

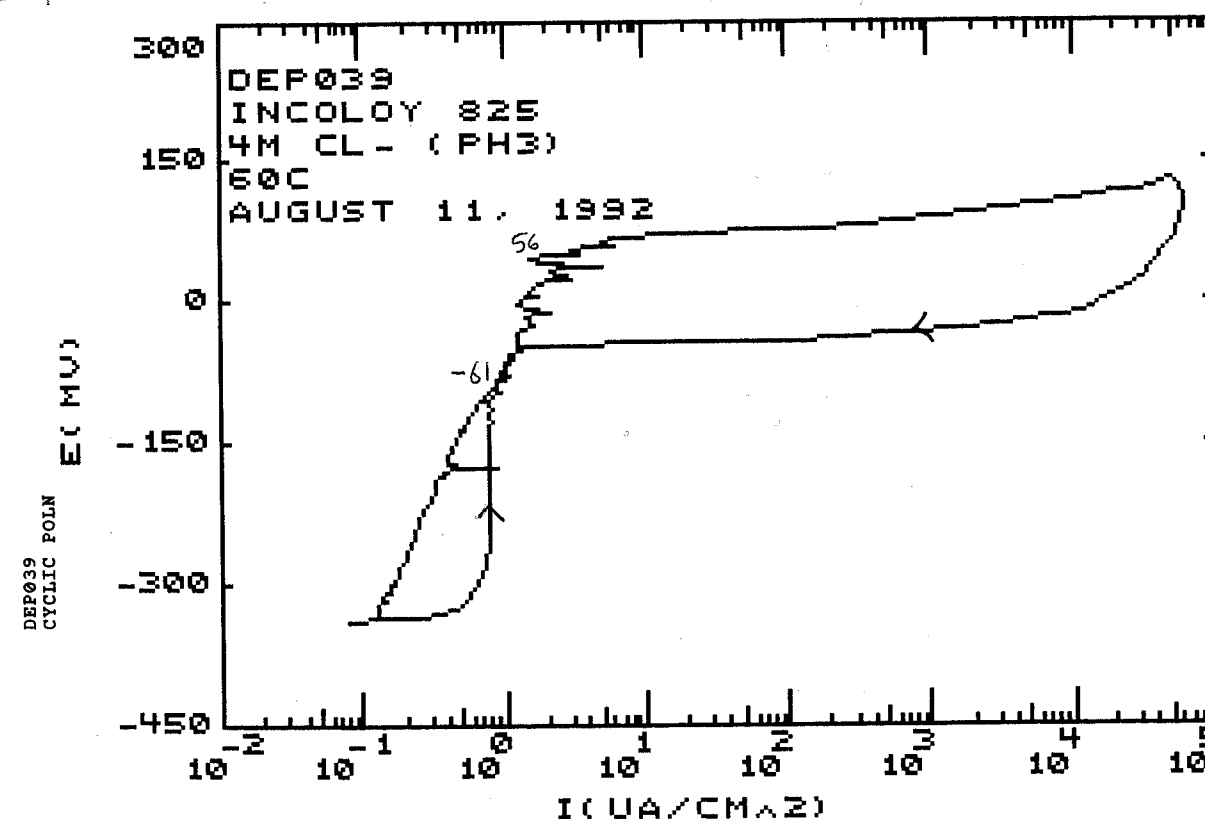
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-337
4
61557.09
-7.086505
8.062284E-02
61557.09

LEGEND

DEPO39 08/11/92
INCOLOY 825
HT HH4371FC
4M CL-
PH3
AR PURGE
60C



Donald L. Pile
8/11/92

Test 040

pH meter calibration on p. 98

Soln: 600 ml 4MCl⁻ (stock soln. 14, p. 98) 8.200 pH / 20.8C
 added 3.7 ml 2N HCl (p. 38) to bring pH to 1.010 / 21.2C

Spec: Incoloy 825 HT. HH4371FC

 $\ell_{dp} = 0.752 \text{ in}$ $\phi_{dp} = 0.252 \text{ in}$
Specimen immersed $\frac{2}{3}$ length by visual inspectionEstimated S.A. = 2.88 cm^2 Ar purge $\frac{1}{4}$ hr Liquid Carbonic Cylinder # 466156Spec. at O.C.P. 1 hr + $\frac{1}{4}$ hr T = 67C Tag No. 1238001Before scan $E_{corr} = -335 \text{ mV vs. SCE}$ $E_{C.E.} = -190 \text{ mV vs. SCE}$ Platinum foil

T = 67C

EG&G Model 273

Spec: Pitted and etched.

Unimmersed length = 0.247 in

Actual S.A. = 2.90 cm^2

Soln: No precipitates

1.126 pH / 25.1C

DP 8/11/92

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	DEP040
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM ²)	33000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	PASS

SAMPLE PARAMETERS

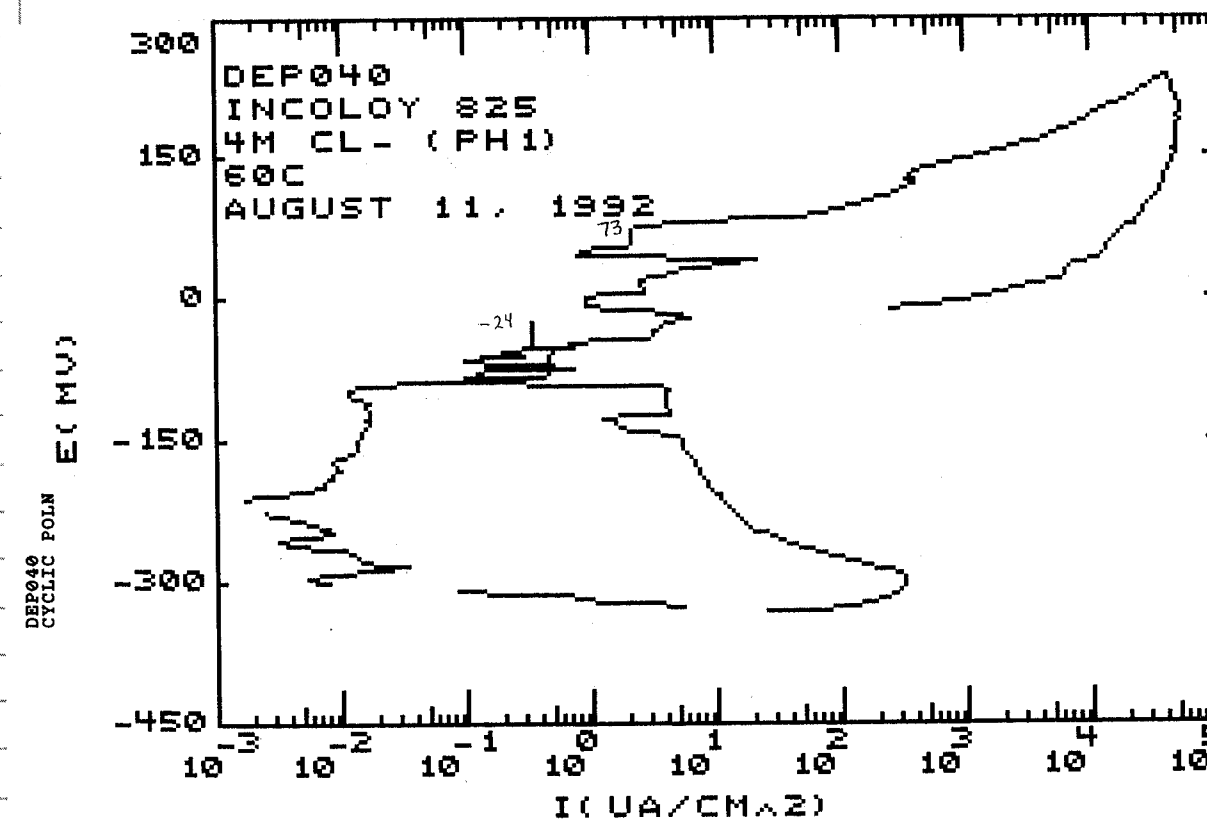
AREA(CMS ²)	2.88
EQ WT(GH)	PASS
DENSITY(GH/CM ³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-332
MV/PT	4
DATA MAX	53020.83
DATA MIN	-5.482639
ABS MIN	0
ABS MAX	53020.83

LEGEND

DEP040 08/11/92
 INCOLOY 825
 HT HH4371FC
 4M CL-
 PH1
 AR PURGE
 60C



Donald L. Pk
 8/11/92

Soln. 15 3MCl⁻

351.13 g NaCl Fisher Lot No. 917219 } Mettler
 added to Nanopure Water to make 2.0 L soln.
 DP 8/11/92

Test 041 (DEP041 - PILE 1 disk)

pH meter calibration: buffers listed p. 94

7.03 / 20.7C 4.00 / 21.0C 1.00 / 21.0C 96.4% slope

Soln: 600 ml 4M Cl⁻ (stock soln 14, p. 98) 7.555 pH / 20.6C

added 10.0 ml conc. HCl (Fisher Lot No. 920004) to bring to 0.008 pH / 21.3C

Spec: Incoloy 825 HT. HH4371FC

 $\phi = 0.638 \text{ cm}$ $l = 1.916 \text{ cm}$ Spec. immersed $\frac{2}{3}$ lengthEstimated S.A. = 2.88 cm^2 Ar purge $1\frac{1}{2}$ hr Liquid carbonic Cylinder # RK3110Spec. at O.C.P. 1 hr. $66\text{C} < T < 68\text{C}$ Before scan $E_{\text{corr}} = -292 \text{ mV vs. SCE}$ $E_{\text{CE}} = 382 \text{ mV vs. SCE}$ Graphite $T = 67\text{C}$ $60\text{C} < T < 75\text{C}$ test duration

Spec: Pitted and etched.

Unimmersed length = 0.627 cm Actual S.A. = 2.90 cm^2

Soln: No precipitates. Mint color.

 $-0.008 \text{ pH} / 24.5\text{C}$

DP 8/12/92

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E(MV)
 VERTEX E(MV)
 FINAL E(MV)
 SCAN RATE(MV/S)
 THRESHOLD I(UA/CM²)
 CONDITION E(MV)
 CONDITION T(S)
 INIT DELAY(MV/S OR S)

CYCLIC POLN
 DEP041
 0 VS E
 100 VS R
 0 VS E
 .17
 33000
 PASS
 PASS
 PASS

SAMPLE PARAMETERS

AREA(CMS²)
 EQ WT(GM)
 DENSITY(GM/CM³)
 CATHODIC TAFEL(MV)
 ANODIC TAFEL(MV)

2.88
 PASS
 PASS
 PASS
 PASS

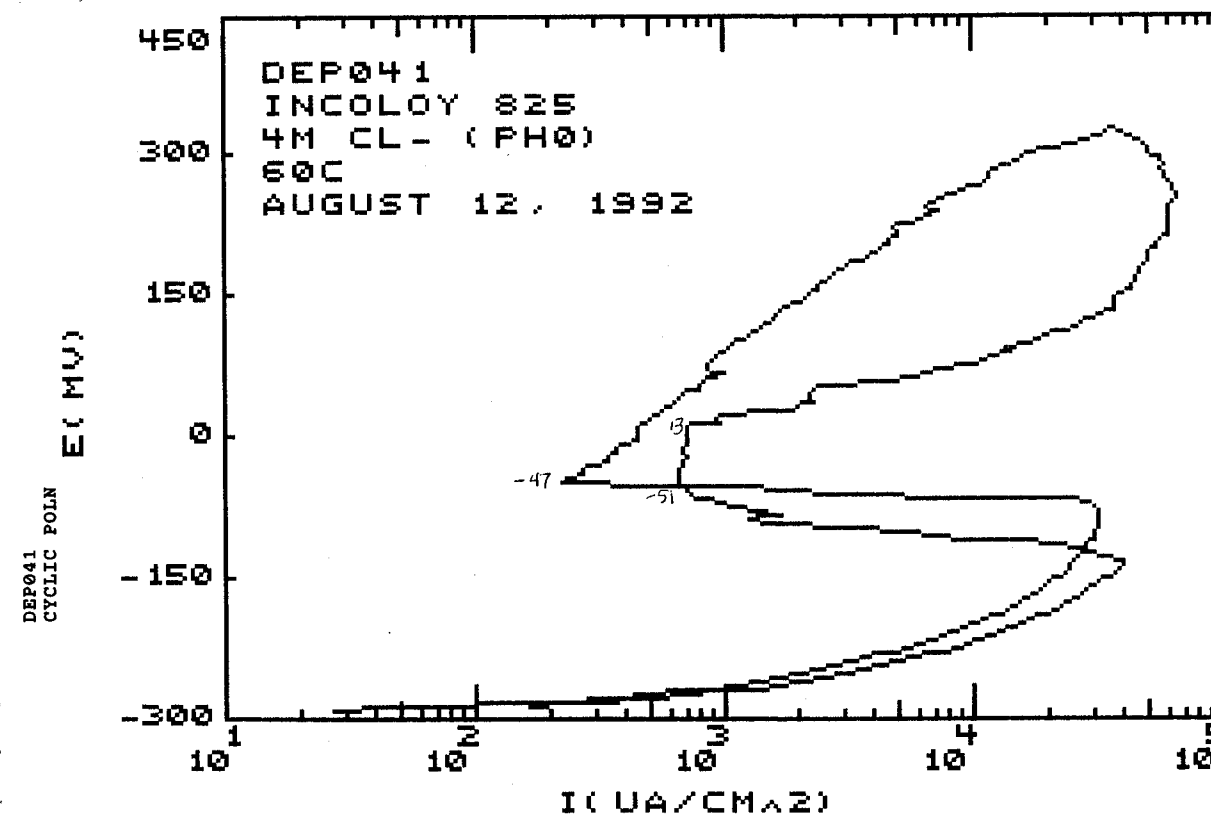
DATA SCALE

ECORR
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-291
 4
 64513.89
 -7111.111
 27.53472
 64513.89

LEGEND

DEP041 08/12/92
 INCOLOY 825
 HT HH4371FC
 4M CL-
 PH0
 AR PURGE
 60C



Donald L. Pike
 8/12/92

Test 042 (DEP042 - PILE2 disk)

pH meter calibration on p. 102

Soln: 600 ml 0.5M Cl⁻ (stock soln. 10, p. 72) 6.080 pH / 21.2 C

Spec: Incoloy 825 Ht. HH4371FC

 $\phi = 0.640$ cm $l = 1.903$ cmSpec. immersed $\frac{2}{3}$ lengthEstimated S.A. = 2.87 cm²

Ar purge 1 hr Liquid carbonic Cylinder # 466156

Spec. at O.C.P. $1\frac{1}{4}$ hr $91C < T < 92C$ Tag No. 123800Before scan $E_{corr} = -451$ mV vs. SCE $E_{c.e.} = 54$ mV vs. SCE Platinum $T = 91C$ $91C < T < 95C$ test duration

EG&G Model 273

Spec: Pitts ϵ corrosion films (yellow/brown to blue/grey)

Unimmersed length = 0.653 cm

Actual S.A. = 2.83 cm²

Soln: Reddish/brown precipitates.

Filtered w/ Fisher Brand (Coarse) Paper

8.476 pH / 27.8 C

DY 8/12/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP042
0 VS E
100 VS R
0 VS E
17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.87
PASS
PASS
PASS
PASS

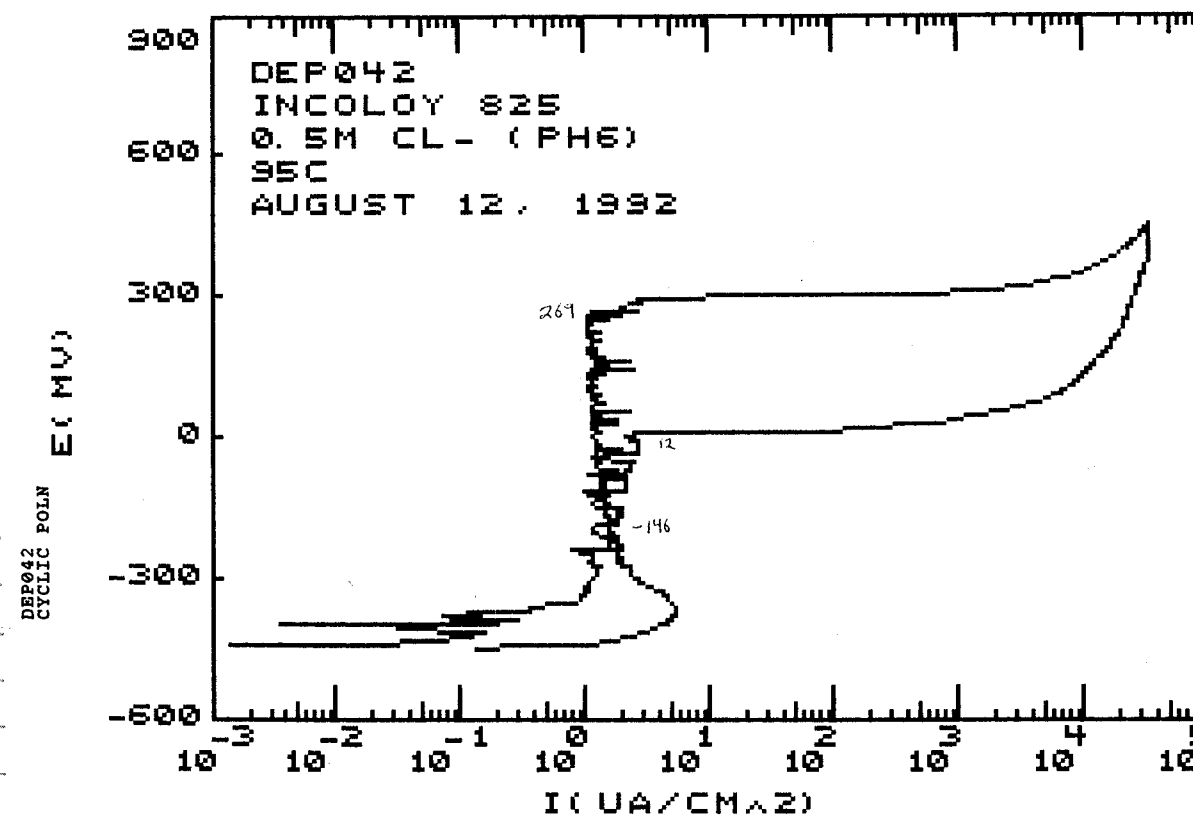
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-448
4
35017.42
-5.226481E-02
1.393728E-03
35017.42

LEGEND

DEP042 08/12/92
INCOLOY 825
HT HH4371FC
0.5M CL-
PH6
AR PURGE
95C



Donald L. Rie
8/12/92

Test 043 (DEP043 - PILE1 disk)

pH meter calibration : buffers listed p. 94

7.03/20.6C 4.00/20.8C 1.00/20.8C 96.2% slope

Soln: 600ml 3MCl⁻ (stock soln. 15, p. 102) 7.020 pH/20.6C

added ~~0.7ml~~ 0.07 ml 2NHCl soln (p. 38) to bring to 3.084 pH/20.7C

Spec: Incoloy 825 Ht. HH4371FC

$\phi = 0.638$ cm $l = 1.922$ cm

Spec. immersed $\frac{2}{3}$ length

Estimated S.A. = 2.87 cm^2

Ar purge 1hr Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1hr $94^\circ\text{C} < T < 97^\circ\text{C}$

Before scan $E_{\text{corr}} = -351 \text{ mV vs. SCE}$

$E_{\text{c.e.}} = 169 \text{ mV vs. SCE}$ Graphite

$T = 97^\circ\text{C}$

$T = 95$ at end

Spec: Pitted; ~~light etch~~ corrosion film

Unimmersed length = 0.589 cm

Actual S.A. = 2.99 cm^2

Soln: Yellowish color w/ greyish precipitate.

Filtered w/ Fisher Brand paper (coarse)

5.947 pH/24.5C

DP 8/13/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP043
0 VS E
100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.87
PASS
PASS
PASS
PASS

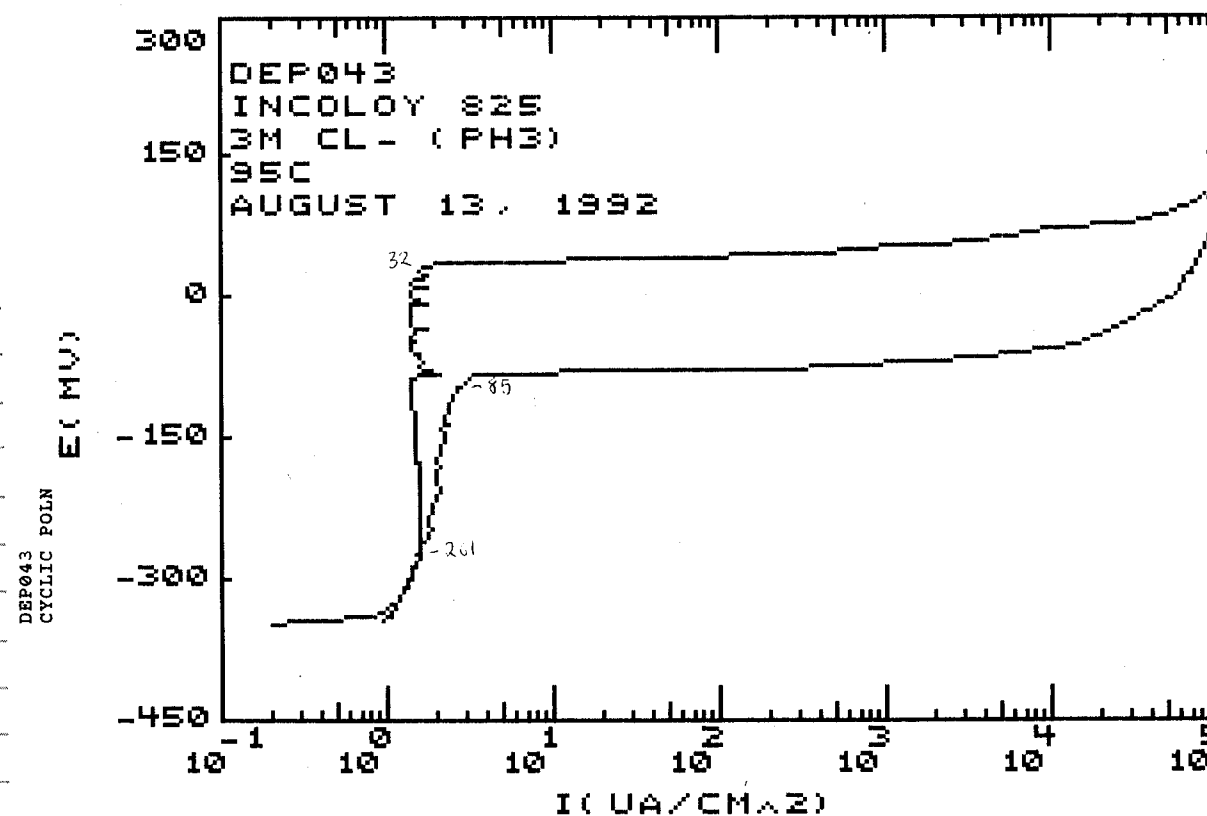
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-349
4
95470.39
-7135.889
.195122
95470.39

LEGEND

DEP043 08/13/92
INCOLOY 825
HT HH4371FC
3M CL-
PH3
AR PURGE
95C



Donald L. Pile
8/13/92

Soln. 16 4M Cl⁻

467.55g NaCl Fisher Lot No. 917219 } Mettler

added to Nanopure Water to make 2.0L soln.

DP 8/13/92

Test 044 (DEP044 - PILE2 disk)

pH meter calibration on p. 106

Soln: ¹⁰⁰⁰~~600~~ml 4M Cl⁻ (stock soln. 16, above) 8.470 pH / 21.2Cadded 0.08 ml of mixture of half 2N HCl soln (p. 38) and other
half Nanopure water. 4.758 pH / 22.0C

Spec: AISI 304L SS HT. T0954

 $\phi = 0.635$ cm $l = 1.907$ cmSpec. immersed $\frac{2}{3}$ lengthEstimated S.A. = 2.85 cm²Ar purge $\frac{1}{4}$ hr Liquid Carbonic Cylinder # 466156Spec at O.C.P. 1 hr. $94C < T < 95C$ Tag No. 1238001Before scan $E_{corr} = -421$ mV vs. SCE $E_{c.e.} = 38$ mV vs. SCE Platinum $T = 95C$ * $92C < T < 95C$

EG&G Model 273

* T dropped to 80C in last 15 minutes

Spec: General corrosion; black corrosion product

Unimmersed length = 0.573 cm

Actual S.A. = 2.98 cm²

Soln: Blue/grey precipitates

Filtered w/ Fisher Brand paper (coarse).

10.668 pH / 24.8C

DP 8/13/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTEX E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

CYCLIC POLN
DEP044
0 VS E
100 VS R
0 VS E
17
33000
PASS
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA (CMS²)
EQ WT (GM)
DENSITY (GM/CM³)
CATHODIC TAFEL (MV)
ANODIC TAFEL (MV)

2.85
PASS
PASS
PASS
PASS

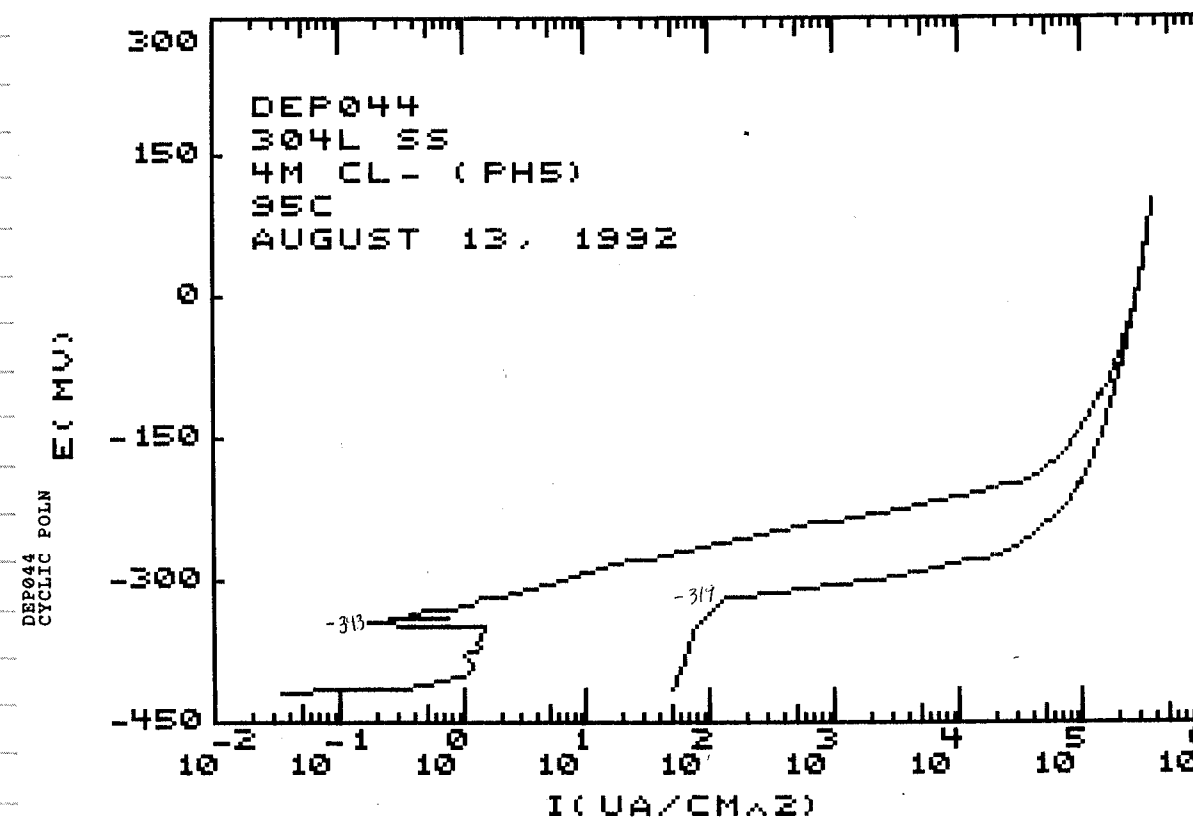
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-419
4
375438.6
-3719298
3.508772E-02
375438.6

LEGEND

DEP044 08/13/92
AISI 304L
HT T0954
4M CL-
PH5
AR PURGE
95C



Donald L. Pile
8/13/92

Soln. 17 4MCl-
467.85g NaCl Fisher Lot No. 917219 } Mettler
added to Nanopure water to make 2.0L soln.

DP 8/13/92

Updated Data Table (DEPA551.WQ1)

DEP	Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	ipeak	peak/pass
5	304L	30	9.271	-488	-51	-484	4E-07	4E-07	1
10		30	5.504	-459	-219	-235	4E-06	8E-05	20
13		30	1.086	-461	-184	-213	7E-05	0.0025	35.71429
20		30	0.028	-426	Active		Active		ERR
6R		95	8.902	-745	-286	-529	1E-06	2E-06	2
9		95	5.75	-405	-353		2E-06	2E-06	1
14		95	1.281	-434	Active		Active		ERR
7	316L	30	9.288	-685	-48	-237	6E-07	1.5E-06	2.5
11		30	5.912	-436	-147	-288	2.5E-06	1.2E-05	4.8
15		30	1.044	-400	-176		3E-05	0.00035	11.66667
8		95	8.79	-708	-187	-348	1E-06	2E-06	2
12		95	4.867	-345	-287	-325			ERR
16R		95	1.398	-352	-288	-240	0.015	0.04	2.66667
22	Alloy 825	30	3.429	-323	770	757	1E-06	6E-06	6
19		30	0.008	-284	913	913	2E-05	0.0015	75
21		30	-0.355	-287	Active		Active		ERR
39		60	5.23	-337	56	-61	8E-07	8E-07	1
40		60	1.126	-332	73	-24	4E-06	0.0003	75
41		60	-0.008	-291	-47	13	0.00025	0.03	120
38		95	8.174	-624	-7	-312	7E-07	1.5E-06	2.142857
37		95	7.427	-321	-40	-317	1E-06	1E-06	1
17		95	1.064	-340	-39	-120	2E-05	0.004	200
18R		95	0.095	-288	Active		Active		ERR

DEP	Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	ipeak	peak/pass
28	304L	30	1.086	-432	-43	-16	7E-06	0.0005	71.42857
30		30	0.105	-428	Active		Active		ERR
24		95	1.049	-405	-130	-145	0.0005	0.05	100
26		95	0.107	-382	Active		Active		ERR
27	Alloy 825	30	1.035	-269	816	791	1E-06	4E-06	4
29		30	0.173	-284	869	864	4E-06	0.0003	75
42		95	8.476	-448	269	-146	1.5E-06	5E-06	3.333333
23		95	0.998	-301	248	19	8E-06	0.0005	62.5
25		95	0.094	-292	Active		Active		ERR

DEP	Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	ipeak	peak/pass
36	304L	30	1.082	-465	-166	-97	2E-05	0.001	50
32		95	4.98	-433	-313	-365	1.2E-06	1.2E-06	1
34		95	1.028	-446	-310	-262	0.00025	0.003	12
35	Alloy 825	30	1.095	-290	835	835	1E-06	6E-06	6
31		95	1.069	-277	96	-77	2E-06	2E-06	1
33		95	0.028	-289	Active		Active		ERR

DEP	Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	ipeak	peak/pass
43	Alloy 825	95	5.947	-349	32	-261	1.5E-06	1.5E-06	1

Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	ipeak	peak/pass
Alloy 825	30	9.2	-416	817	165	5E-07	5E-07	1
	95	9.2	-385	504	-40	8E-07	8E-07	1

Alloy	Temp.	pH	Ecorr	Ebreak	Erep.	ipass	ipeak	peak/pass
Alloy 825	30	9.2	-533	716	-20	5E-07	5E-07	1
	95	9.2	-479	418	-343	7E-07	7E-07	1

-85 from
Curve

1/20/93

Donald L. Pile
8/20/92

DEP037R (DEP037R - PILE1 disk)

pH meter calibration:

Buffer Soln pH 7.00 Fisher Lot No. 913828-24 7.03 / 20.4C
" 4.00 " 922046-24 4.00 / 20.2C
" 96.9% 1.00 " 913288-18 1.00 / 20.2C
94.7% slope

Soln: 900ml 4MCl- (stock Soln. 16, p. 108) 7.634 pH / 20.1C
added 0.15 ml 2N HCl (p. 38) to reach pH 3.109 / 20.1C

Spec: INcoloy 825 Ht. HH4371FC

$\phi = 0.638 \text{ cm}$ $l = 1.921 \text{ cm}$

Spec. immersed $\frac{2}{3}$ length

Estimated S.A. = 2.88 cm^2

Ar purge 1 hr.

Liquid Carbonic Cylinder # RK3110

Spec. at O.C.P. 1 1/4 hr

$94^\circ\text{C} < T < 97^\circ\text{C}$

Before scan $E_{\text{corr}} = -364 \text{ mV vs. SCE}$

$E_{\text{CE}} = 244 \text{ mV vs. SCE}$

Platinum

$T = 97^\circ\text{C}$

$97^\circ\text{C} < T < 98^\circ\text{C}$ for test duration

Spec: Pitted, Yellow/brownish film

Unimmersed length = 0.613 cm

Actual S.A. = 2.94

Soln: Dark color before precipitates (purplish-grey) cooled & settled.
Filtered w/ Coarse Fisherbrand paper.

8.830 pH / 24.6C

DP 8/29/92

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
DEP037R
0 VS E
100 VS R
0 VS E
.17
33000
PASS
PASS
PASS

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

2.88
PASS
PASS
PASS
PASS

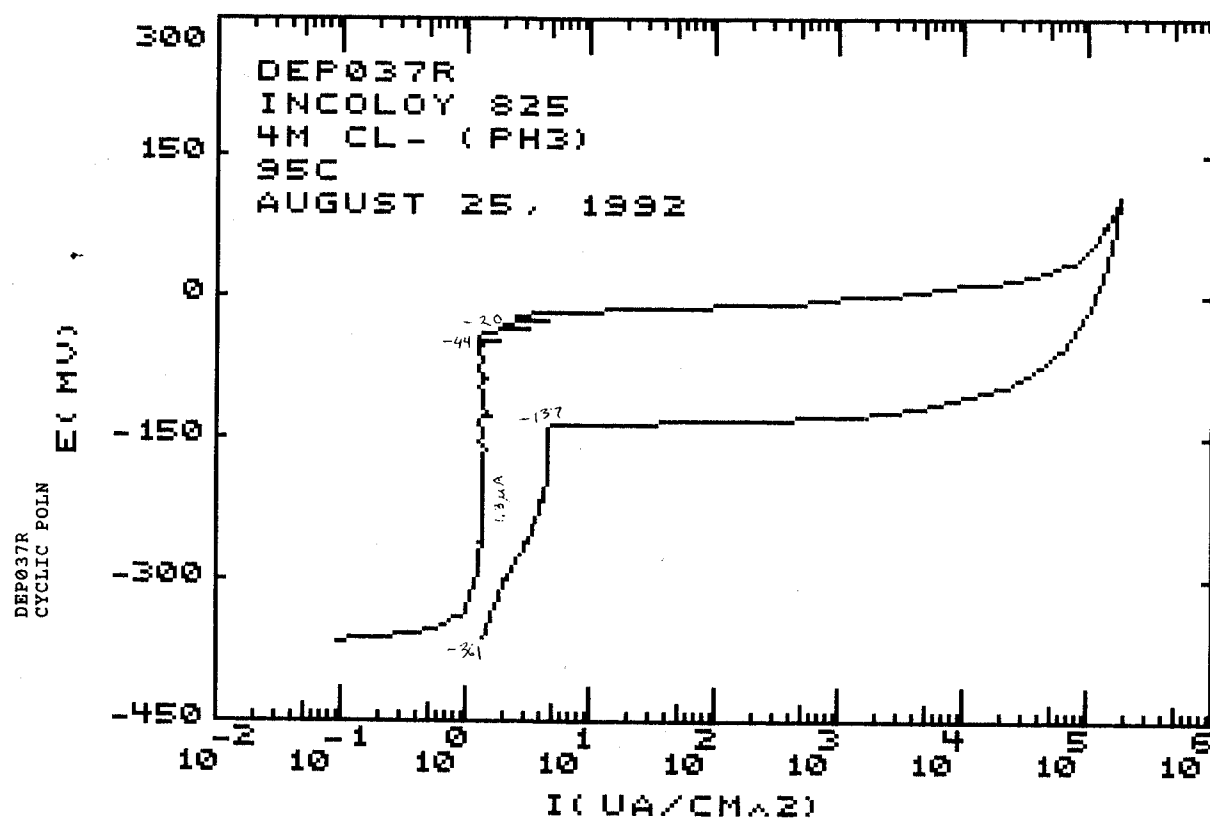
DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-365
4
181597.2
-7111.111
9.027778E-02
181597.2

LEGEND

DEP037R 08/25/92
INCOLOY 825
HT HH4371FC
4M CL-
PH3
AR PURGE
95C



Donald L. Pile
8/25/92

4M CL- pH3 check

pH meter calibration : buffers listed p. 111

7.03 / 21.4C 4.00 / 21.4C 1.00 / 21.4C
95.6% slope

Soln: 600ml 4M CL- (stock soln. 17, p. 110) 8.380 pH / 21.3C
added 0.06 ml 2N HCl (p. 38) to bring to 2.866 pH / 21.4C

Set up cell as before but w/out electrodes

Ar purge Liquid Carbonic Cylinder # RK3110

Temperature reached 95°C range w/in 45-50 mins of purge start.

Temperature was maintained at 97°C - 98°C for duration

Total "purge" time 5 hours ^{to} 5 1/4 hours

Soln: 2.919 pH / 96.1°C
2.722 / 25.2°C

DP 8/26/92

3M KCl Salt Bridge Soln.

44.7666g KCl (reagent grade) Fisher Lot No. 901422
44.73370g DP

added to Nanopure water to make 200ml soln.

DP 8/27/92

Test 038R (DEP038R - PILE1 disk)

pH meter calibration: buffers listed p. 111

7.03 / 21.4C 4.00 / 21.3C 1.00 / 21.3C

96.3 % slope

Soln: 600 ml 4MCl⁻ (stock soln. 17) p. 110 8.169 pH / 21.6C

Spec: Incoloy 825 Ht. HH4371FC

 $\phi = 0.638 \text{ cm}$ $L = 1.921 \text{ cm}$ Spec. immersed $\frac{2}{3}$ lengthEstimated S.A. = 2.88 cm^2

Ar purge 1hr

Liquid Carbonic Cylinder RK3110

Spec. at O.C.P. 1hr

 $95^\circ\text{C} < T < 98^\circ\text{C}$ Before scan $E_{\text{corr}} = -474 \text{ mV vs. SCE}$ $E_{\text{c.e.}} = 76 \text{ mV vs. SCE}$

Platinum

 $T = 97^\circ\text{C}$

* Data lost to computer malfunction

Spec: Pitted

Unimmersed length = 0.748 cm Actual S.A. = 2.67 cm^2

Soln: Purplish/brown precipitates

Filtered w/ Fisher brand coarse paper

9.016 pH / 23.6C

Unfiltered

9.184 pH / 23.5C

DP 8/27/92

Salt bridge Liquid Junction Potential MeasurementsCell soln: 4MCl⁻ soln. (soln. 17, p. 110)

Keithley 614 Electrometer Ser. No. 467374

Reference Electrodes Fisher Brand

#1 (higher) potential difference 1.9 mV = Voltage #1 - Voltage #2

#2

Thermometer Fisher Brand Tag No. 1238003

~~Ar~~ Ar purge Liquid Carbonic Cylinder #RK3110

Bridge soln	Voltage #2 - Voltage #1	T
3M KCl before purge	+2.8 mV	21°C
after purge	+2.7 mV	21°C
Sat'd NaCl	+0.9 mV	21°C
0.5N NaCl	+4.8 mV	22°C

3M KCl soln p. 113

Donald L. Pae 8/28/92

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1/7/93

Cr DEPLETED ALLOY 825 TEST 825CR1 1/6/92
CYCLIC POLN TESTSPECIMEN ALLOY 825 CUBIC SAMPLE
TOTAL SURF AREA 8.33 cm^2 (IMMERS60)
Cr DEPLETED AREA 3.22 cm^2 (IMMERS60)
BULK COMPOSITION 600 GRET 5.11 cm^2 (IMMERS60)SOLUTION: 20 PPM Cl^- , 85 PPM HCO_3^- 20 ppm SO_4^{2-}
10 ppm NO_3^- 2 PPM F^- MAKE AS FOLLOWS
20 ml / 1000 ppm Cl^- (3.29560g NaCl / 2000ml # 922649A)
0.11510g NaHCO_3 LOT # 897789
10 ml / 1000 ppm NO_3^- (1.3706g NaNO_3 # 897183)
20 ml / 1000 ppm SO_4^{2-} (1.4787g Na_2SO_4 # 901213)
2 ml / 1000 ppm F^- (2.2100g NaF # 896405)
 NaNO_3 , Na_2SO_4 & NaF STOCK SOLN'S 1000 ml
TEMP 95°C PURGED W/ ARGON $E_{\text{CORR}} = -557 \text{ mV SCE KEITNLEY 614}$ $E_{\text{PT}} = -366 \text{ mV SCE}$

REFERENCE FISHER 13-620-51 SN 0165403

RUN PARAMETERS & PLOT PAGE 118

D. D.
1/7/93

117

1/7/93

Cr DEPLETED ALLOY 825 825 CR2 1/7/92
CYCLIC POLN TESTSPECIMEN: ALLOY 825 CUBIC SAMPLE
TOTAL SURF AREA IMMERS60: 8.33 cm^2
Cr DEPLETED SA IMMERS60: 3.22 cm^2
BULK COMPOSITION SA IMMERS60: 5.11 cm^2 SOLUTION. 100 PPM Cl^- 85 PPM HCO_3^-
20 PPM SO_4^{2-} 10 PPM NO_3^- 2 PPM F^- AS FOLLOWS
100 ml / 1000 ppm Cl^- (3.29560g NaCl / 2000ml # 922649A)
0.11612g NaHCO_3 LOT # 897789
20 ml / 1000 ppm SO_4^{2-} (1.4787g Na_2SO_4 / 1000 ml # 901213)
10 ml / 1000 ppm NO_3^- (1.3706g NaNO_3 / 1000 ml # 897183)
2 ml / 1000 ppm NO_3^- (2.2100g NaF / 1000 ml # 896405)
+ N_2O TO 1000 ml PH = 8.151
TEMP 95°C H_2 THERMO 1238002 PURGED W/ ARGON $E_{\text{CORR}} = -529 \text{ mV SCE KEITNLEY 614}$ $E_{\text{PT}} = -278 \text{ mV SCE}$

REFERENCE FISHER 13-620-51 SN 0165403

RUN PARAMETERS & PLOT P 119.

END PN 9.936

D. D.
1/7/93

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
PASS
PASS
INIT DELAY(MV/S OR S)

CYCLIC POLN
825CR1
0 VS E
100 VS E
0 VS E
.16
10000
PASS
PASS
300 S

SAMPLE PARAMETERS

AREA(CM²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

8.33
PASS
PASS
PASS
PASS

DATA SCALE

ECORR
MV/FT MAX
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-564
4
3325.33
-49.81993
6.002401E-03
3325.33

RESULTS

E(I=0) (MV)

20 PPM SO4

CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)
I-CORR(UA/CM²)
CORR RATE(MFY)
E(I=0)(MV)
POL RES. (K-OHMS CM²)
I-CORR(UA/CM²)
CORR RATE(MFY)

10 PPM NO3
2 PPM F
95 DEGREES C ARGON PURGED

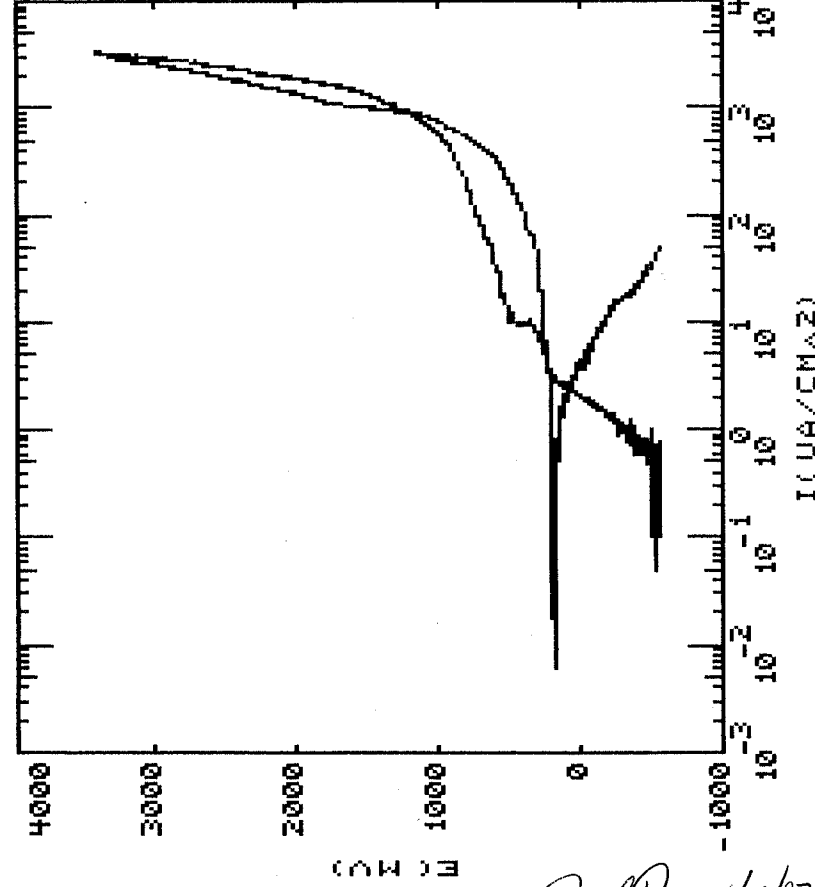
LEGEND

825CR1 ALLOY 825 CR DEPLETED
HH 4371FC
1/6/92
AREA = 8.33 CM2
3.22 CM2 CR DEP
5.11 CM 600 SIC
20 PPM CL
85 PPM HCO3

8/31/94

David D 1/7/93

825CR1
CYCLIC POLN



David D 1/7/93

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
PASS
PASS
INIT DELAY(MV/S OR S)

CYCLIC POLN
825CR2
0 VS E
100 VS E
0 VS E
.17
5000
PASS
PASS
300 S

SAMPLE PARAMETERS

AREA(CM²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)

8.32
PASS
PASS
PASS
PASS

DATA SCALE

ECORR
MV/FT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-532
4
2202.881
-2.458583
4.921969E-02
2202.881

RESULTS

E(I=0) (MV)
CATHODIC TAFEL(MV)
ANODIC TAFEL(MV)
I-CORR(UA/CM²)
CORR RATE(MFY)
E(I=0)(MV)
POL RES. (K-OHMS CM²)
I-CORR(UA/CM²)
CORR RATE(MFY)

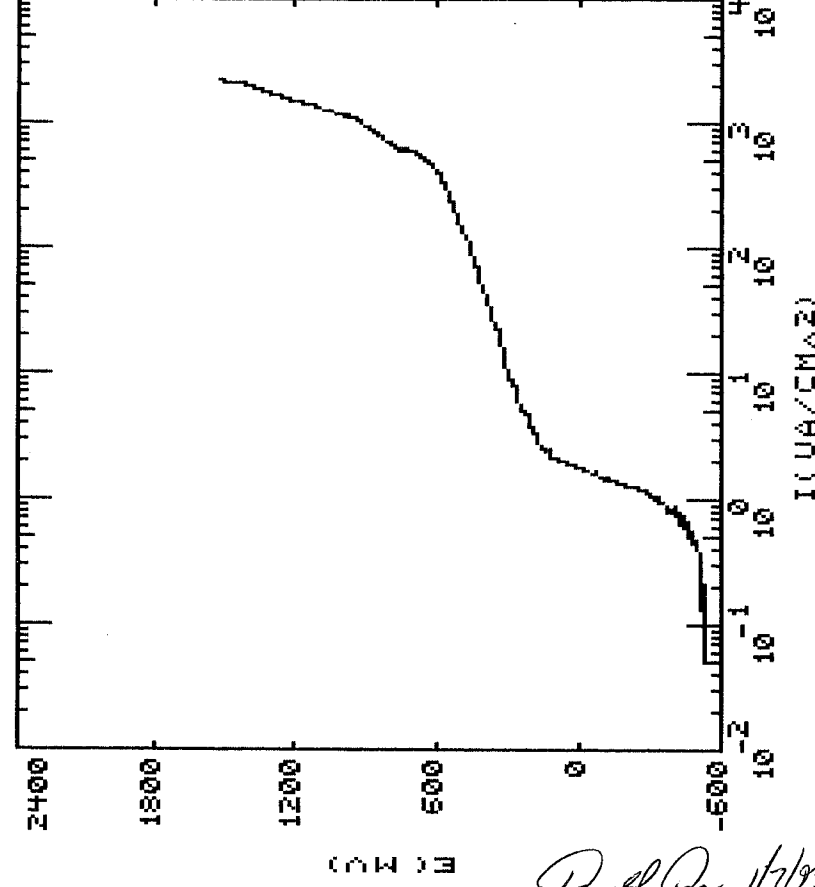
10 PPM NO3
2 PPM F
TEMP = 95 C
ARGON PURGED

LEGEND

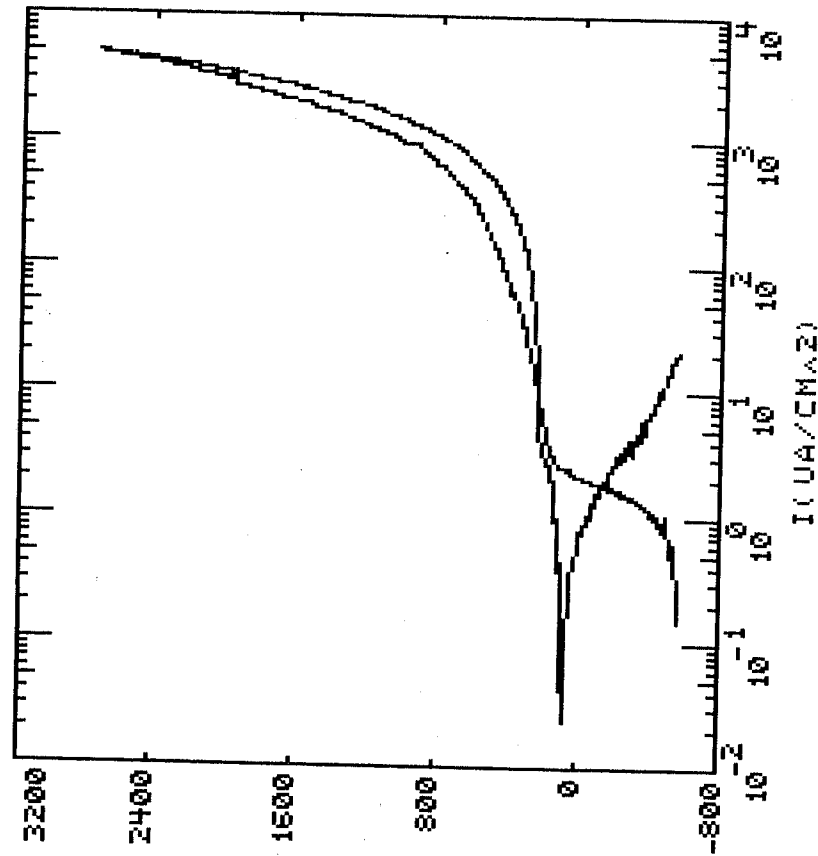
825CR2 1/7/92 ALLOY 825 CR DEP
8.33 CM2
3.22 CM2 CR DEP
5.11 CM2 BULK COMPOSITION
HH4371FC
23.91299 G
100 PPM CL
85 PPM HCO3
20 PPM SO4

David D 1/7/93

825CR2
CYCLIC POLN



David D 1/7/93

825CR3
CYCLIC POLN

E (MV)

D.D. 1/7/93

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (MV)
VERTICAL E (MV)
FINAL E (MV)
SCAN RATE (MV/S)
THRESHOLD I (UA/CM²)
CONDITION E (MV)
CONDITION T (S)
INIT DELAY (MV/S OR S)

SAMPLE PARAMETERS

AREA (CM²)
EQ WT (G)
DENSITY (G/CM³)
CATHODIC TAP (MV)
ANODIC TAP (MV)

DATA SCALE

ECORR
RV/FT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

RESULTS

E(I=0) (MV)
CATHODIC TAP (MV)
ANODIC TAP (MV)
I-CORR (UA/CM²)
CORR RATE (MFY)
E(I=0) (MV)
POL RES. (K-OHMS CM²)
I-CORR (UA/CM²)
CORR RATE (MFY)

10 PPM NO₃
2 PPM F
TEMP = 95 C ARGON PURGED
0.167 MV/SEC

LEGEND

825CR3
1/8/93
CR DEP ALLOY 825
8.33 CH2 AREA
3.22 CH2 CR DEP
5.11 CH2 600 SIC BULK COMP
100 PPM CL
85 PPMHCO₃
20 PPM SO₄

D.D. 1/7/93

1/7/93

CYCLIC POZN ALLOY 825 CR DEPLETED 825CR3

SPECIMEN ALLOY 825 CR DEPLETED

TOTAL AREA 8.33 cm²CR DEP AREA 3.22 cm²BULK COMP 600 GRI AREA 5.11 cm²

CLEANED IN ACETONE, RINSED W/ DI WATER.

SOLUTION 100 PPM Cl⁻, 85 PPM HCO₃⁻, 20 PPM SO₄²⁻
10 PPM NO₃⁻, 2 PPM F⁻ TEMP 95°C
ARGON PURGED. N₂ THERMO 1238002.

SOLUTION MAKE AS FOLLOWS:

100 ml / 1000 ppm Cl⁻ (STOCK SOLUTION # 1000 Cl - 1/93
3.29721 g NaCl LOT 922649A / 2000 ml)

85 PPM HCO₃⁻ = 0.11614 g NaHCO₃ LOT 897789
20 ml / 1000 ppm SO₄²⁻ (STOCK SOLUTION SO₄ - 1/93
1.48040 g Na₂SO₄ LOT 901213 / 1000 ml)

10 ml / 1000 ppm NO₃⁻ (STOCK SOLUTION NO₃ - 1/93
1.37258 g NaNO₃ LOT 897183 / 1000 ml)

2 ml / 1000 ppm F⁻ (STOCK SOLUTION F - 1/93
2.20977 g NaF LOT 896405 / 1000 ml)

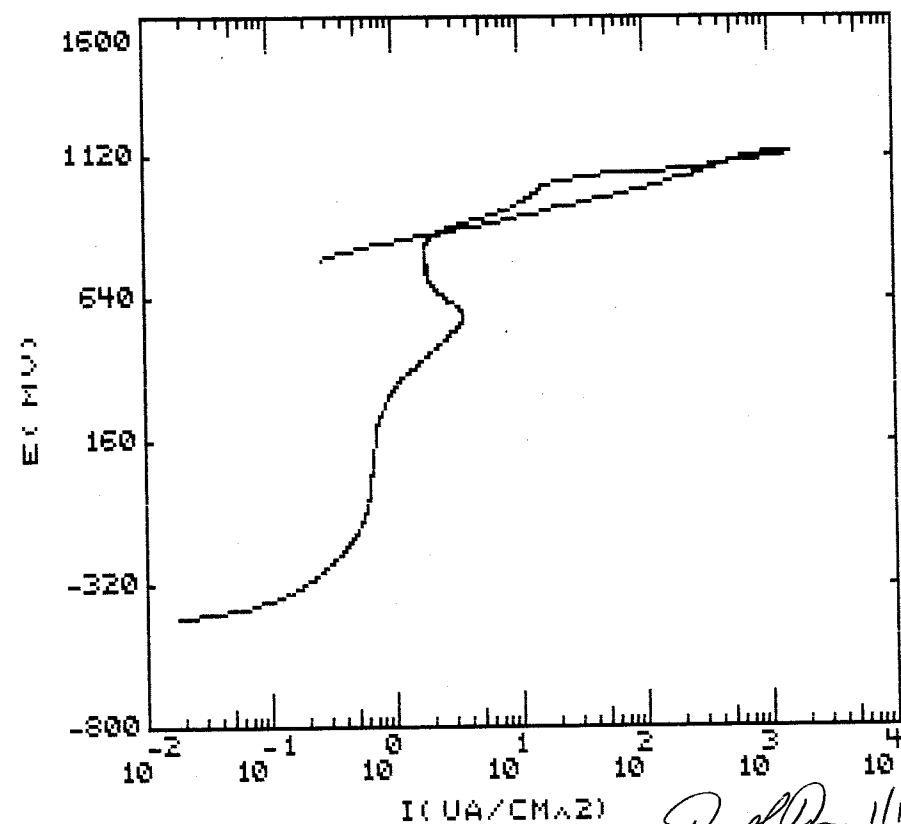
+ DI H₂O TO 1000 mlE_{CORR} = -563 mV KEITNLEY 614E_{PT} = -193 mV " "

REFERENCE FISHER SCE 13-620-51 SNO165403

RUN PARAMETERS AND PLOT PAGE 120

END PN 9.614

D.D.



RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTEX E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
825CRCP
0 VS E
-100 VS R
0 VS E
.17
1000
PASS
PASS
300 S

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAPEL(MV)
ANODIC TAPEL(MV)

2.875
PASS
PASS
PASS
PASS

DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-433
4
1474.783
-712.3478
5.913043E-03
1474.783

LEGEND

825CRCP
IN 825
600 SIC BULK COMP
0.5 M CL
85PPM HCO3
20 PPM SO4
10 PPM NO3
2PPM F
ROOM TEMP ARGON PURGED

[Signature]
11/13/93

11/13/93

~~11/13/92~~

CYCLIC POLARIZATION ALLOY 825 BULK COMPOSITION

SPECIMEN ALLOY 825 BULK COMPOSITION HN 4371FC

600 SIC FINISH $l = 0.750"$ $d = 0.252"$

START WT: 4.48981g

END WT: 4.48947g

IMMERSED $2/3$ l OR $\approx 0.500"$ TOTALWET SURFACE AREA = 2.875 cm^2 SOLUTION 0.5M NaCl, 85PPM HCO_3^- , 20PPM SO_4^{2-} 10PPM NO_3^- 2PPM F^- MAKE AS FOLLOWS

29.23553g NaCl Lot 922649A

0.11645g NaHCO_3 Lot 89778920ml SS# SO_4 -1/93 (1000 PPM SO_4^{2-} AS Na_2SO_4)10ml SS# NO_3 -1/93 (1000 PPM NO_3^- AS NaNO_3)2ml SS# F -1/93 (1000 PPM F^- AS NaF)+ $\text{DI H}_2\text{O}$ TO 1000 mlT = AT ROOM TEMP $\approx 19^\circ\text{C}$ ARGON PURGED

START PH = 7.879 BEFORE ARGON PURGE

END PH = 8.649

DATA SAVED AS 825CRCP ON COMPAQ 386/20

USING M342C SOFTWARE.

POTENTIOSTAT EG&G MODEL 173 SN 62101 CALIBRATION

DUE 28 MAY 93

REFERENCE FISHER SCE 13-620-51 SN 0165403

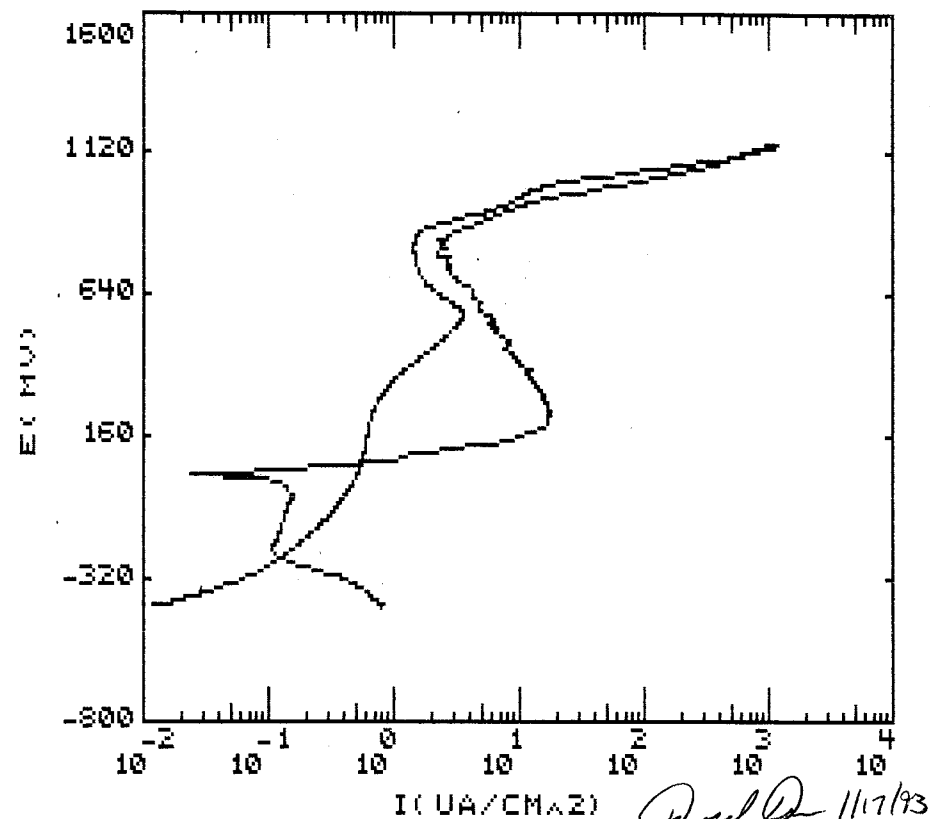
ECORR = -430 mV KETTLBY 614 SN 467374

EPT = +192.0 mV KETTLBY 614 " "

PLOT & RUN PARAMETERS P 122

[Signature]
11/13/93

1/17/93

825CRC2
CYCLIC POLN

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	825CRC2
INITIAL E (MV)	0 VS E
VERTEX E (MV)	-100 VS R
FINAL E (MV)	0 VS E
SCAN RATE (MV/S)	.17
THRESHOLD I (μA/CM²)	1000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM²)	4.2
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAFEL (MV)	PASS
ANODIC TAFEL (MV)	PASS

DATA SCALE

ECORR	-417
MV/PT	4
DATA MAX	1211.905
DATA MIN	-8476191
ABS MIN	3.095238E-03
ABS MAX	1211.905

LEGEND

825CRC2 ALLOY 825 HH4371FC
600 SIC
4.20 CM²
0.5 M CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
T = 19 C ARGON PURGED

Daniel D
11/17/93

11/17/93

CYCLIC POLARIZATION ALLOY 825 BULK COMP.

825 CRC2

SPECIMEN : ALLOY 825 600 GRIT FINISH

HH 4371FC CLEANED IN ULTRASONIC
BATN, DI WATER, ACETONE RINSED IN
DI WATER. $l = 0.753$ $d = 0.252$

WET SURFACE AREA: 4.2 CM²

START WT: 4.53748 g

END WT: NOT RECORDED

SAMPLE COMPLETELY IMMERSSED

SOLUTION : SAME AS 825CRC2 P 123

T AT ROOM TEMP $\approx 19^\circ\text{C}$

PURGED W/ ARGON

START pH = 7.838

END pH = 8.698

DATA SAVED AS 825CRC2 ON COMPAQ 386/20
USING PARC M342C SOFTWARE

POTENTIOSTAT : SAME AS 825CRC2 P 123

REFERENCE FISHER 13-620-SI SNO165403

ECORR = -468 mV KEITHLEY 614 SN 467374

EPT = NOT RECORDED

CONNECTED KEITHLEY 614 TO COUNTER ELECTRODE

AND ECORR CHANGED TO -100 mV, STOPPED

EPT AND LET SAMPLE GO TO ECORR $\approx 4:00$ PM

ECORR = -419.1 mV 10:25 PM KEITHLEY 614

EPT = +91.4 mV " " "

ECORR BY M342 = -440 mV SCE W/ KEITHLEY 614 CONNECT

AND ECORR = -419 mV W/ KEITHLEY 614 DISCONNECTED

Daniel D
11/17/93

1/18/93

CYCLIC POLARIZATION ALLOY 825
825CR4; 825CR42, 825CR43

SPECIMEN ALLOY 825 Cr DEPLETED
8.33 cm², 5.11 cm BULK COMPOSITION
600 GRIT FINISH, 3.22 cm²
Cr DEPLETED NH 4371FC
START WT 23.91339g
END WT.

SOLUTION 2 1 liter BATCHES OF 1000 ppm Cl⁻
85 ppm NaCO₃ 20 ppm SO₄²⁻ 10 ppm NO₃⁻
2 ppm F⁻ MAXS AS FOLLOWS

#1 1.64959g NaCl LOT 922649A
0.11598g NaHCO₃ LOT 897789
20 ml SS# SO₄ -1/93 DETAILS P.121
10 ml SS# NO₃ -1/93 " "
2 ml SS# F⁻ -1/93 " "

#2 1.64899g NaCl LOT 922649A
0.11731g NaHCO₃ LOT 897789
20 ml SS# SO₄ -1/93
10 ml ~~40 ml~~ SS# NO₃ -1/93
2 ml SS# F⁻ -1/93

825CR4 SOLUTION #1 95°C ARGON PURGE

START PN = 8.161

END PN = 9.648

E_{CORR} = -581.6 mV SCE

E_{PT} = -195.3 mV SCE

825CR42 #2 95°C ARGON PURGE

START PN = 8.174

END PN = 9.517

E_{CORR} = -496.8 mV SCE

E_{PT} = -191.2 mV SCE

825CR43 #1 95°C ARGON PURGE

START PN = 8.161

END PN =

ABORTED DUE

E_{CORR} = -400.5 mV

TO POWER FAILURE

E_{PT} = -129.2 mV

1/19/93

REFERENCE ELECTRODE FISHER 13-620-51
SN 0165403 SCE

POTENTIOSTAT SAME AS PAGE 123

DATA SAVED ON COMPAQ 386 USING PARC M342C
SOFTWARE AS 825CR4, 825CR42, 825CR43
825CR44

825CR44 #1 95°C ARGON PURGE

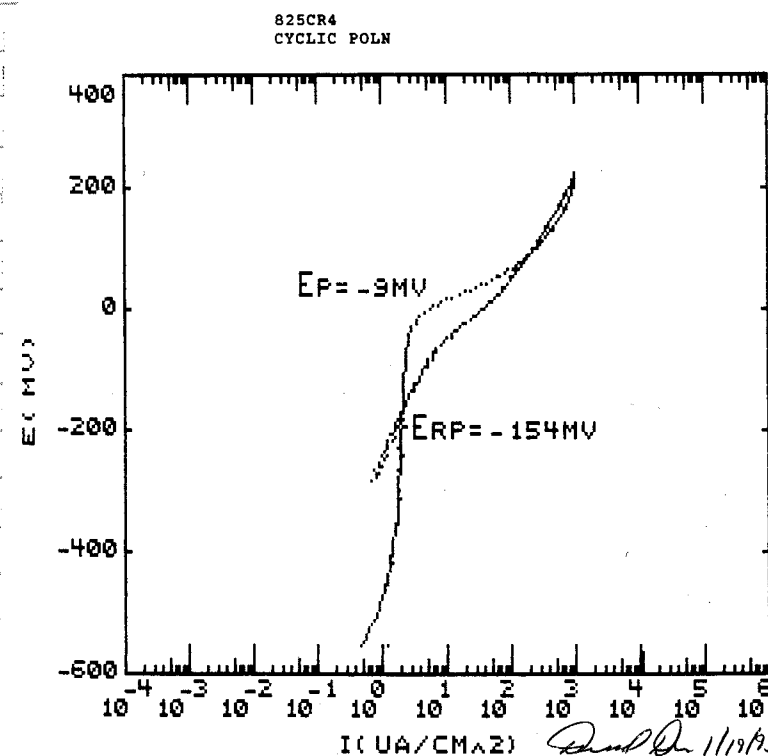
E_{CORR} = -~~389.4 mV~~ -375.1 mV

E_{PT} = -~~455.5 mV~~ -400.7 mV

START PN = 8.161 7/25/94

END PN = 9.611

[Signature]
1/19/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	825CR4
INITIAL E (mV)	0 VS E
VERTEX E (mV)	-100 VS R
FINAL E (mV)	0 VS E
SCAN RATE (mV/S)	.17
THRESHOLD I (uA/cm²)	1000
CONDITION E (mV)	PASS
CONDITION T (S)	PASS
INIT DELAY (mV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM²)	8.33
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAFEL (mV)	PASS
ANODIC TAFEL (mV)	PASS

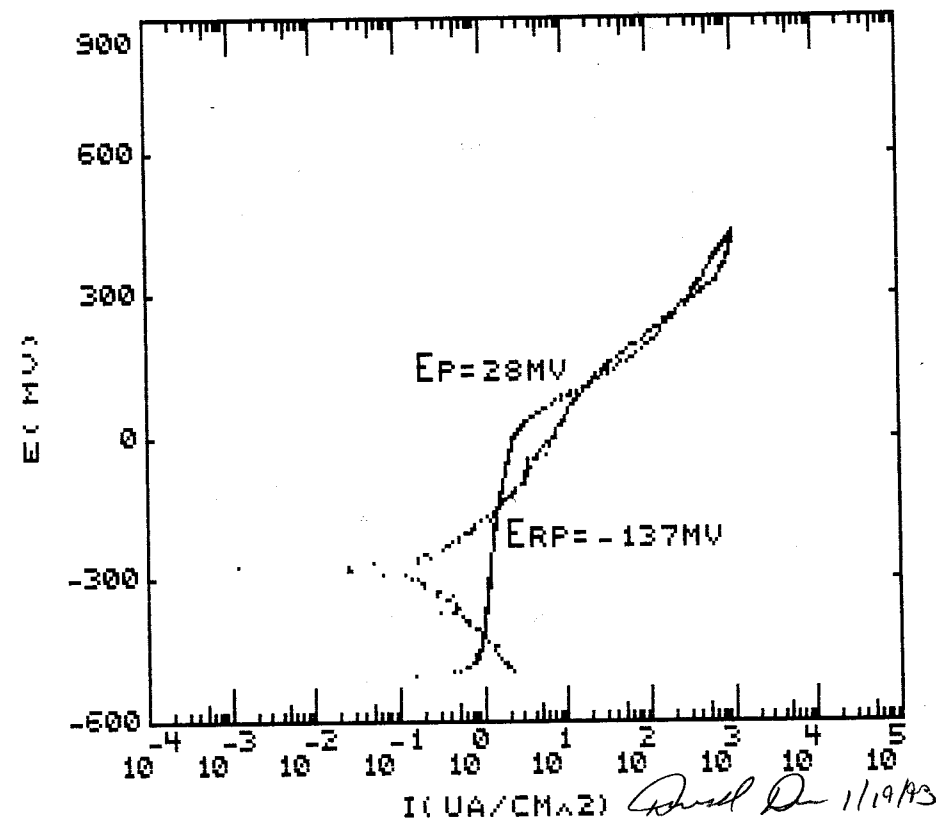
DATA SCALE

ECORR	-598
mv/pt	4
DATA MAX	1039.616
DATA MIN	-11068.43
ABS MIN	0
ABS MAX	11068.43

LEGEND

825CR4 ALLOY 825 1/18/92
5.11 CH2 600 SIC 3.22 CH2 CR DEP
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F⁻
95 C ARGON PURGED

[Signature]
1/19/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	825CR42
INITIAL E (MV)	0 VS E
VERTEX E (MV)	-100 VS R
FINAL E (MV)	0 VS E
SCAN RATE (MV/S)	.17
THRESHOLD I (UA/CM²)	1000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM²)	8.33
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAFEL (MV)	PASS
ANODIC TAFEL (MV)	PASS

DATA SCALE

ECORR	-501
MV/PT	4
DATA MAX	1051.621
DATA MIN	-2.211285
ABS MIN	1.20048E-03
ABS MAX	1051.621

RESULTS

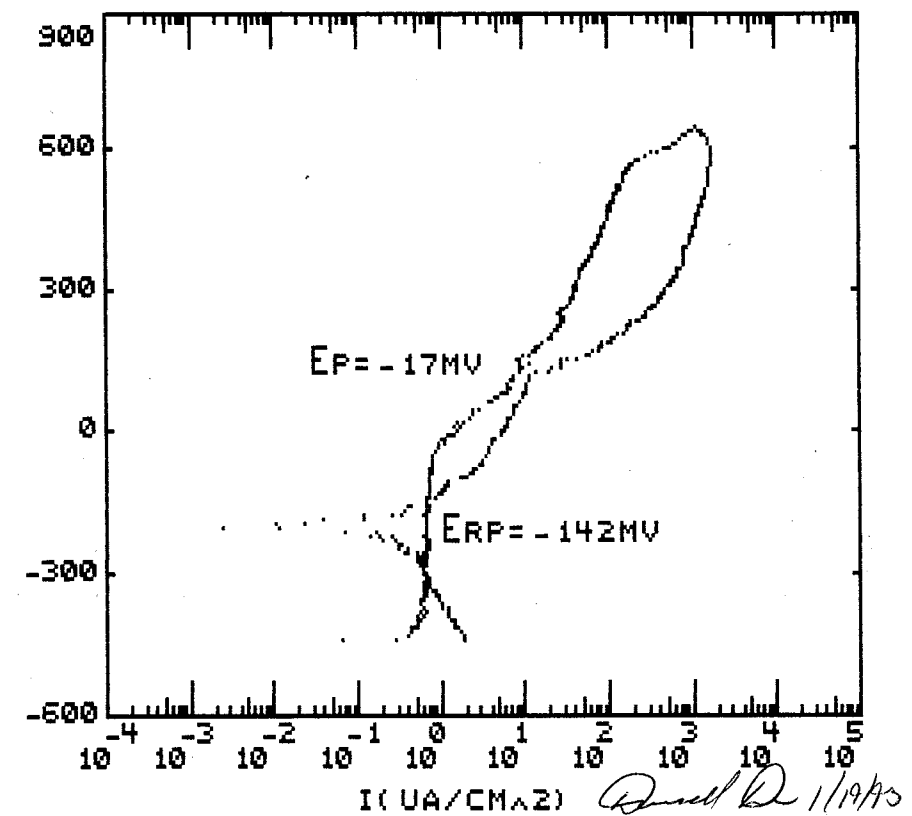
E(I=0) (MV)	RUN NUMBER 2
CATHODIC TAFEL (MV)	
ANODIC TAFEL (MV)	
I-CORR (UA/CM²)	
CORR RATE (MPY)	
E(I=0) (MV)	
POL RES. (K-OHMS CM²)	
I-CORR (UA/CM²)	
CORR RATE (MPY)	

LEGEND

825CR4 ALLOY 825 1/18/92
5.11 CM2 600 SIC 3.22 CM2 CR DEP
1000 PPM CL
85 PPM HCO3

20 PPM SO4
10 PPM NO3
2 PPM F
95 C ARGON PURGED

D. D.
1/19/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	825CR44
INITIAL E (MV)	0 VS E
VERTEX E (MV)	100 VS R
FINAL E (MV)	0 VS E
SCAN RATE (MV/S)	.17
THRESHOLD I (UA/CM²)	1000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM²)	8.33
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAFEL (MV)	PASS
ANODIC TAFEL (MV)	PASS

DATA SCALE

ECORR	-442
MV/PT	4
DATA MAX	1709.484
DATA MIN	-1.921969
ABS MIN	2.40096E-03
ABS MAX	1709.484

RESULTS

E(I=0) (MV)	2 PPM F
CATHODIC TAFEL (MV)	95 C ARGON PURGED
ANODIC TAFEL (MV)	RUN 4
I-CORR (UA/CM²)	(RUN 3 - POWER FAILURE)
CORR RATE (MPY)	
E(I=0) (MV)	
POL RES. (K-OHMS CM²)	
I-CORR (UA/CM²)	
CORR RATE (MPY)	

LEGEND

825CR43 1/19/93
IN 825 CR DEP
HM4371FC
3.22 CM2 CR DEPLETED
5.11 CM2 600 SIC BULK COMP
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3

D. D.
1/19/93

1/26/93

CYCLIC POLARIZATION 316CL1

SPECIMEN 316L HT# P80746 600 GRIT FINISH
 $l = 0.748''$ $d = 0.248''$ WET AREA = 2.80 cm^2
 START WT = ~~4.29856 g~~ 4.30353 g
 END WT = NOT RECORDED
 SPECIMEN CLEANED IN ULTRASONIC BATH
 RINSED IN ACETONE & DI WATER.

SOLUTION 10000 PPM Cl^- 85 PPM HCO_3^- 20 PPM SO_4^{2-}
 10 PPM NO_3^- 2 PPM F^- 1000 ml MAKE AS
 FOLLOWS: 16.48043 g NaCl LOT 922649A
 0.11791 g NaHCO₃ LOT 897789
 20 ml STOCK SOLUTION SO_4 - 1/93
 10 ml STOCK SOLUTION NO_3 - 1/93
 2 ml STOCK SOLUTION F^- - 1/93
 (STOCK SOLUTION DETAILS P 121)
 + DI H₂O TO 1000 ml
 START PH = 7.945
 END PH = 9.343

TEMP = 95°C PURGED w/ ARGON

POTENTIOSTAT SAME AS 825CRCP A 123

DATA SAVED AS 316CL1 USING
 PARC M342C SOFTWARE.

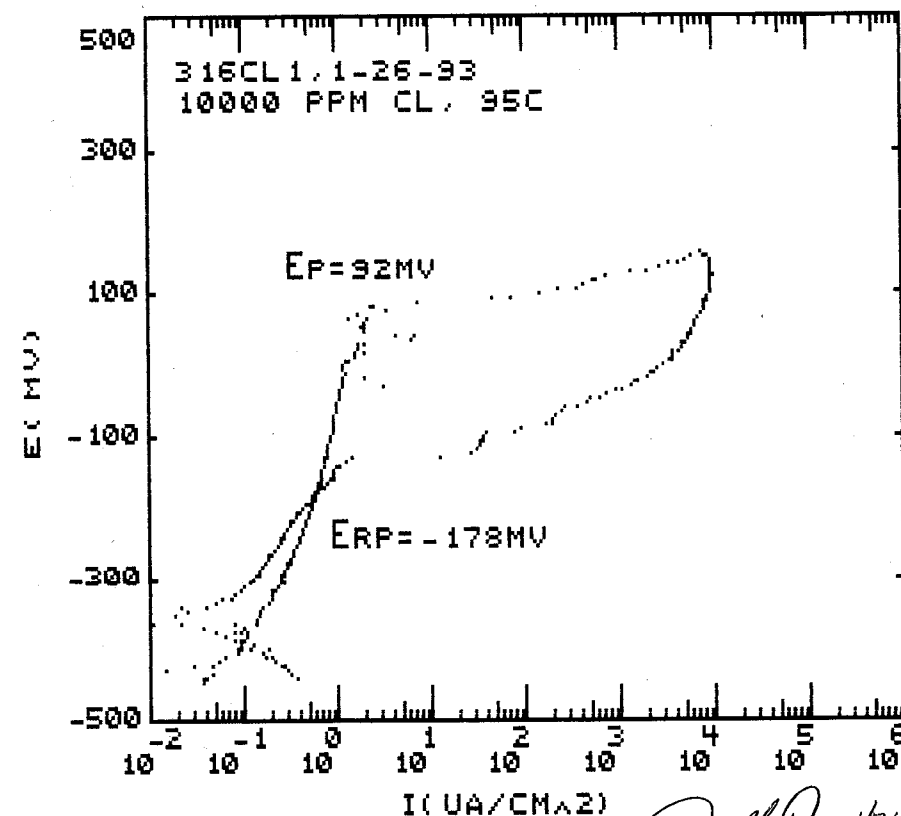
REFERENCE FISHER 13-620-51 SN 0169033

$E_{\text{CORR}} = -430.1 \text{ mV}$ KEITHLEY 617

$E_{\text{PT}} = -121.2 \text{ mV}$ " "

David D.
 1/26/93

316CL1
 CYCLIC POLN



David D. 1/26/93

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	316CL1
INITIAL E (mV)	0 VS E
VERTEX E (mV)	100 VS R
FINAL E (mV)	0 VS E
SCAN RATE (mV/S)	.17
THRESHOLD I (uA/cm^2)	5000
CONDITION E (mV)	PASS
CONDITION T (S)	PASS
INIT DELAY (mV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM^2)	2.8
EQ WT (GM)	PASS
DENSITY (GM/CM^3)	PASS
CATHODIC TAFEL (mV)	PASS
ANODIC TAFEL (mV)	PASS

DATA SCALE

ECORR	-446
MV/PT	4
DATA MAX	9750
DATA MIN	-731.4286
ABS MIN	0
ABS MAX	9750

LEGEND

316L HT#P80746 1/26/93
 600 GRIT FINISH 0.17MV/S
 10000 PPM CL
 85 PPM HCO₃
 20 PPM SO₄
 10 PPM NO₃
 2 PPM F
 T= 95 C ARGON PURGED
 2.80 CM²

David D.
 1/26/93

1/27/93

CYCLIC POLARIZATION 316CL2

SPECIMEN: 316L HT# P80746 600 GRIT FINISH

 $l=0.748"$ $d=0.248"$ WET AREA = 4.38 cm^2

START WT 4.29856 g

END WT NOT RECORDED

SPECIMEN CLEANED IN ULTRA SONIC

BATN RINSED WITH DI WATER, ACETONE

AND DRIED

SOLUTION SAME AS 316CL1 P 130

10000 PPM Cl^- 85 PPM HCO_3^- 20 PPM SO_4^{2-} 10 PPM NO_3^- 2 PPM F^-

START PH: 7.922

END PH NOT RECORDED

TEMP = 95°C ARGON PURGED

POTENTIOSTAT SAME AS 825CRCP P123

DATA SAVED AS 316CL2 USING

PARC M342C SOFTWARE.

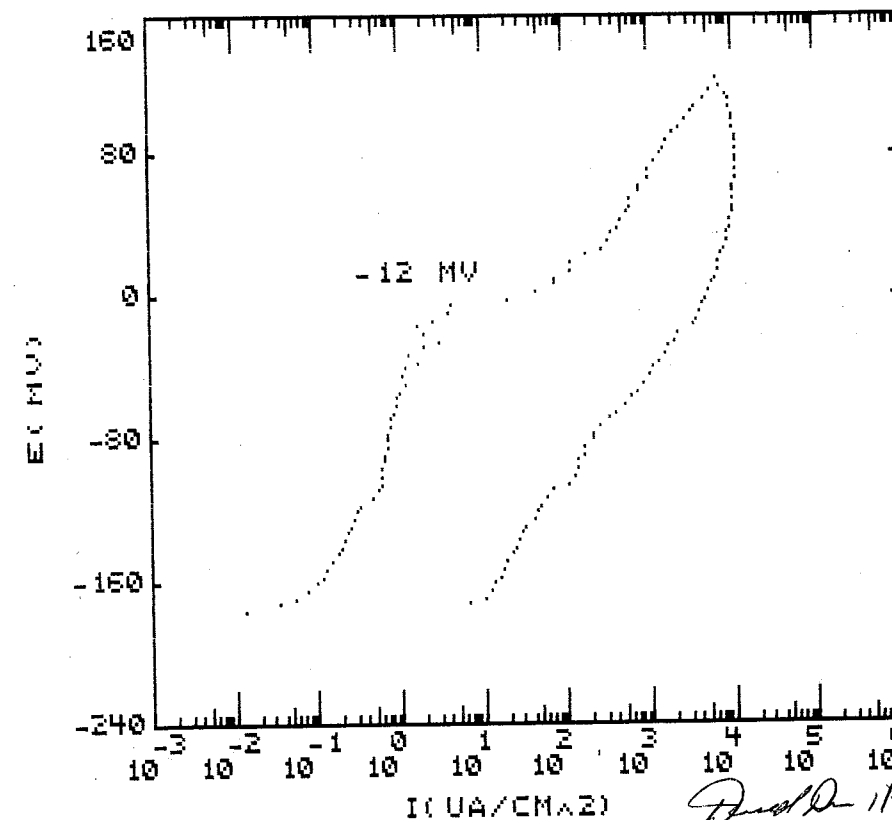
REFERENCE SCE FISHER 13-B20-S1 SN 0169033

 $E_{\text{CORR}} = -178 \text{ mV}$ $E_{\text{PT}} = -118.06 \text{ mV}$

SPECIMEN IN SOLUTION FOR 3 h PRIOR

TO START OF EXP

David D.
1/27/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	316CL2
INITIAL E (mV)	0 VS E
VERTEX E (mV)	100 VS R
FINAL E (mV)	0 VS E
SCAN RATE (mV/S)	.17
THRESHOLD I (uA/cm^2)	5000
CONDITION E (mV)	PASS
CONDITION T (s)	PASS
INIT DELAY (mV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM^2)	4.38
EQ WT (GM)	PASS
DENSITY (GM/CM^3)	PASS
CATHODIC TAFEL (mV)	PASS
ANODIC TAFEL (mV)	PASS

DATA SCALE

E _{CORR}	-176
mV/PT	4
DATA MAX	11347.03
DATA MIN	-467.5799
ABS MIN	.0130137
ABS MAX	11347.03

RESULTS

E(I=0) (mV)	2 PPM F
CATHODIC TAFEL (mV)	T= 95 C ARGON PURGED
ANODIC TAFEL (mV)	
I-CORR (uA/cm^2)	
CORR RATE (MPY)	
E(I=0) (mV)	
POL RES. (K-OHMS CM^2)	
I-CORR (uA/cm^2)	
CORR RATE (MPY)	

LEGEND

316CL2
600 SIC
HT#P80746
1-27-93
4.38 CM2 COMPLETELY IMMERSSED IN
10000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3

David D.
1/27/93

2/2/93

CYCLIC POLARIZATION 825CR5

SPECIMEN ALLOY 825 NH4371FC MILL
 FINISH SURFACES 3.22CM² 60 GRIT
 SPEC SURFACES 5.11CM² SPECIMEN
 CLEANED IN DI WATER & ACETONE
 START WT 23.95820g
 END WT 23.94120g
 SOLUTION 1000 PPMCl⁻ 85 PPM HCO₃⁻ 20 PPM SO₄²⁻
 10 PPM NO₃⁻ 2 PPM F⁻ AS FOLLOWS
 1.64814g NaCl LOT 922649A
 0.11794g NaHCO₃ LOT 89778A
 20ml SO₄²⁻ STOCK SOLUTION SO₄-1/93
 10ml STOCK SOLUTION NO₃-1/93
 2ml STOCK SOLUTION F-1/93
 + WATER TO 1000ml
 T=95°C ARGON PURGED

POTENTIOSTAT EG&G MODEL 173 W M342C
 SOFTWARE DATA SAVED AS 825CR5
 SCAN RATE = 0.17mV/SEC

REFERENCE FISHER 13-620-SI SN 0169033 SCE

E_{CORR} -504mV KEITHLEY 614 CALIB 1/28/94
 E_{AT} -190mV " "

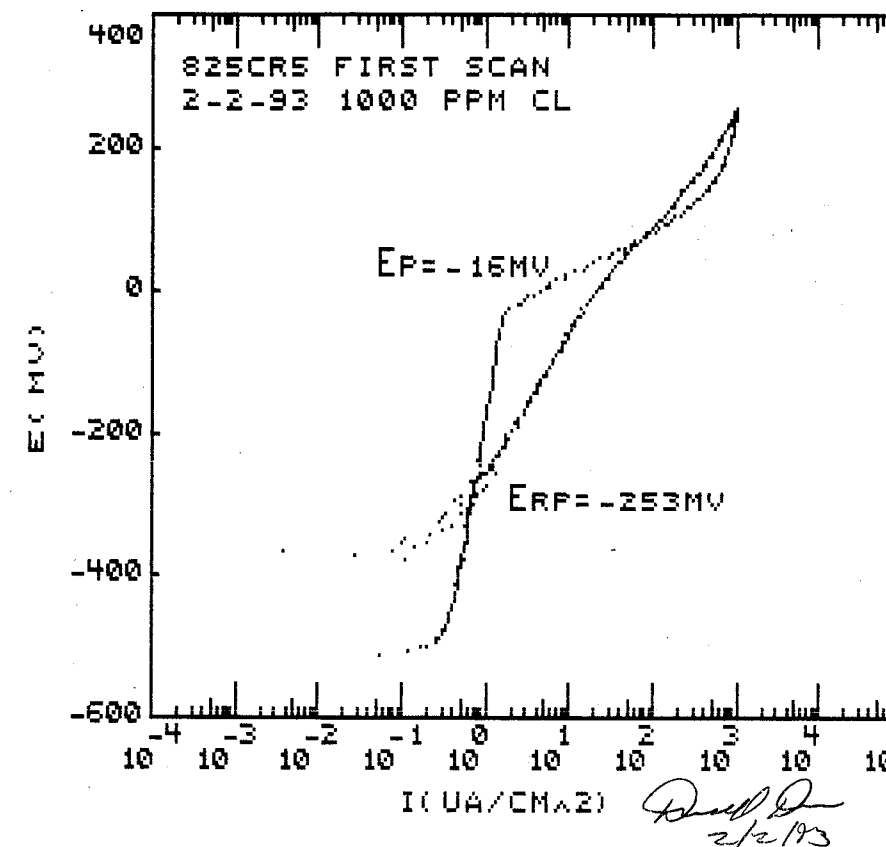
SPECIMEN IN SOLUTION FOR 65 min PRIOR
 TO START OF TEST.

825 CR52 SAME AS ABOVE EXCEPT
 2ND CYCLE.

825CR5	825CR52
START PA 8.107	START PA 8.102
END PA 9.735	END PA 9.798

825 CR53 SAME AS ABOVE EXCEPT 3RD CYCLE
 START PA 8.113 E_{CORR} -314mV
 END PA 9.756 E_{AT} -91mV

Paul D 2/2/93



TECHNIQUE	CYCLIC POL
ORIGINAL NAME	825CR5
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS²)	8.33
EQ WT(CM)	PASS
DENSITY(CM/CM³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

E _{CORR}	-509
MV/PT	
DATA MAX	1028.812
DATA MIN	-1.128451
ABS MIN	3.601441E-03
ABS MAX	1028.812

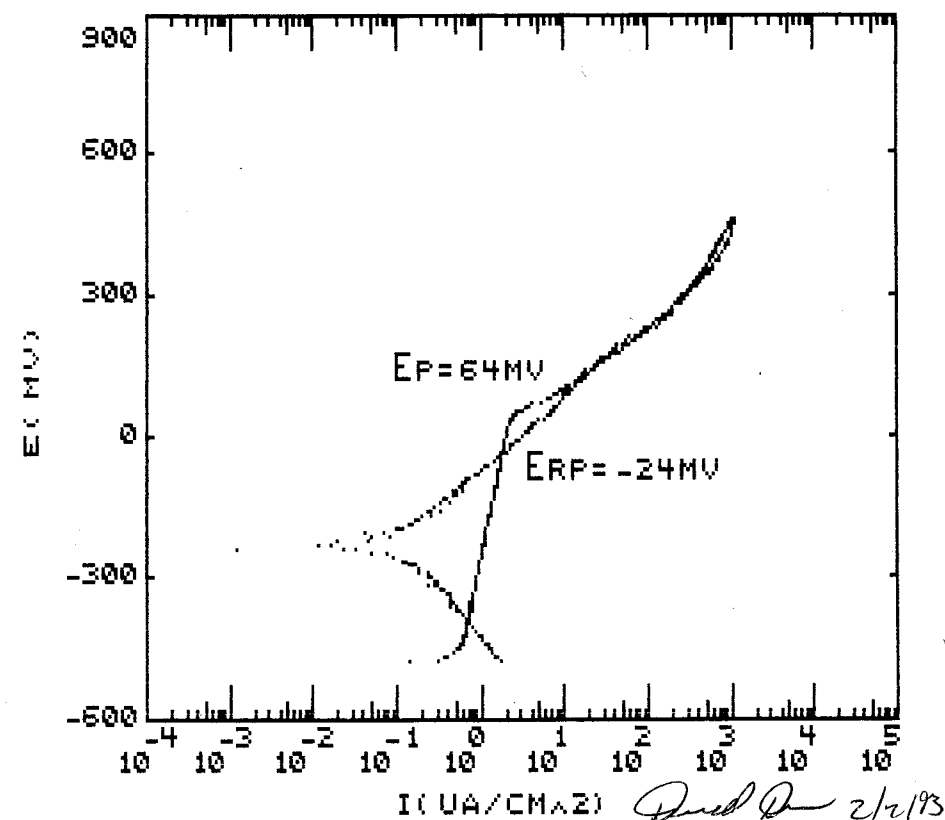
RESULTS

E(I=0)(MV)	BH4371FC (HEAT #)
CATHODIC TAPEL(MV)	
ANODIC TAPEL(MV)	
I-CORR(UA/CM²)	
CORR RATE(MPY)	
E(I=0)(MV)	
POL RES. (K-OHMS CM²)	
I-CORR(UA/CM²)	
CORR RATE(MPY)	

LEGEND

825CR5 ALLOY 825 CR DEP 2-2-93
 3.22 CM² CR DEP
 5.11 CM² 60 SIC
 1000 PPM CL
 85 PPM HCO₃⁻
 20 PPM SO₄²⁻
 10 PPM NO₃⁻
 2 PPM F⁻
 95 C ARGON PURGED
 825CR5

Paul D
 2/2/93



RUN PARAMETERS

TECHNIQUE	825CR52
ORIGINAL NAME	825CR52
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	10
THRESHOLD I(UA/CM ²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	3600 S

SAMPLE PARAMETERS

AREA(CM ²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

ECORR	-476
DATA MAX	1117.647
DATA MIN	-1.677071
ABS MIN	1.28048E-03
ABS MAX	1117.647

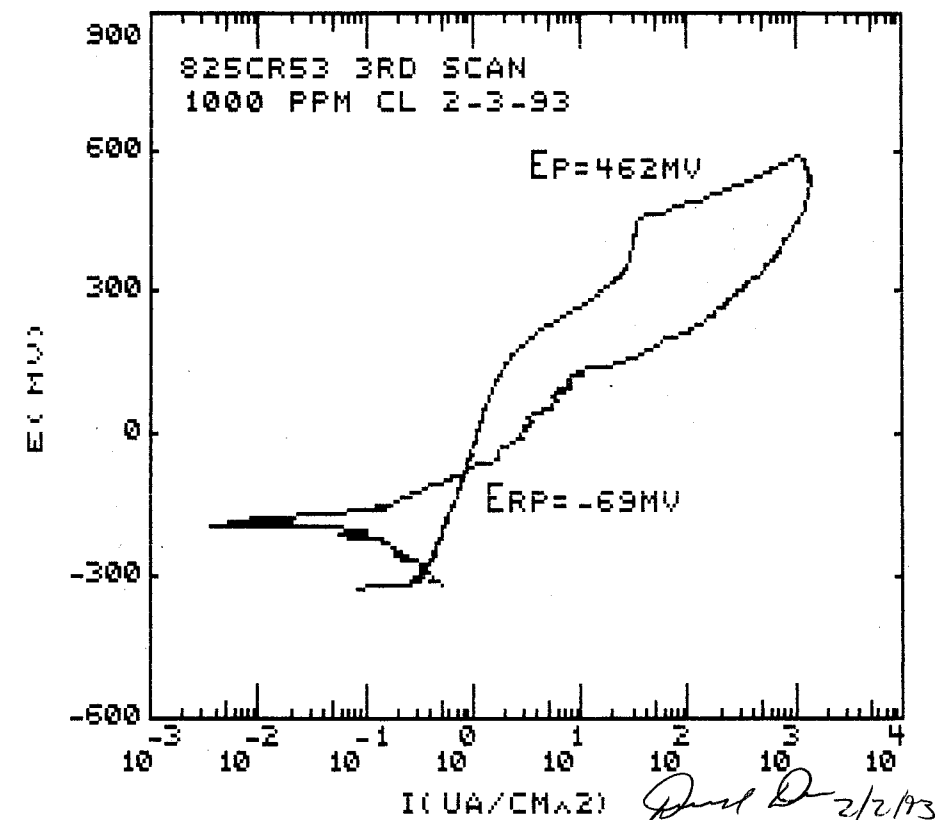
RESULTS

E(1=0)(MV)	BH4371FC (HEAT #)
CATHODIC TAPEL(MV)	
ANODIC TAPEL(MV)	
I-CORR(UA/CM ²)	
CORR RATE(MPY)	
E(1=0)(MV)	
POL RES. (K-OHMS CM ²)	
I-CORR(UA/CM ²)	
CORR RATE(MPY)	

LEGEND

825CR5 ALLOY 825 CR DEP 2-2-93
3.22 CM2 CR DEP
5.11 CM2 60 SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2PPM F
95 C ARGON PURGED

David D
2/2/93



RUN PARAMETERS

TECHNIQUE	825CR53
ORIGINAL NAME	825CR53
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	10
THRESHOLD I(UA/CM ²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	3600 S

SAMPLE PARAMETERS

AREA(CM ²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

ECORR	-323
DATA MAX	1403.361
DATA MIN	-5294118
ABS MIN	3.601441E-03
ABS MAX	1403.361

RESULTS

E(1=0)(MV)	BH4371FC (HEAT #)
CATHODIC TAPEL(MV)	
ANODIC TAPEL(MV)	
I-CORR(UA/CM ²)	
CORR RATE(MPY)	
E(1=0)(MV)	
POL RES. (K-OHMS CM ²)	
I-CORR(UA/CM ²)	
CORR RATE(MPY)	

LEGEND

825CR5 ALLOY 825 CR DEP 2-2-93
3.22 CM2 CR DEP
5.11 CM2 60 SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2PPM F
95 C ARGON PURGED
825CR53

David D
2/2/93

2/3/93

STOCK SOLUTIONS.

1000 PPM NO_3^- AS NaNO_3
 1.37169 g NaNO_3 LOT 897183
 + DI WATER TO 1000 ml
 STOCK SOLUTION # NO_3^- -2/93
 2/3/93 EXP 3/3/93

STOCK SOLUTION # SO_4^{2-} -2/93
 1000 PPM SO_4^{2-} AS Na_2SO_4
 1.47850 g Na_2SO_4 LOT 901213
 + WATER TO 1000 ml
 2/3/93 EXP 3/3/93

STOCK SOLUTION F-2/93
 2.21231 g NaF LOT 896405
 + WATER TO 1000 ml
 2/3/93 EXP 3/3/93

[Signature]
 2/3/93

2/11/93

CYCLIC POLARIZATION CP825T

SPECIMEN: ALLOY 825 HN4371FG 600 SiC
 $\ell = 0.752"$ $d = 0.248"$ WET AREA = 2.80 cm^2
 CLEANED IN DI WATER ULTRASONIC CLEAN
 IN DETERGENT FOR 10 min RINSED IN DI
 WATER, ACETONE & DRIED

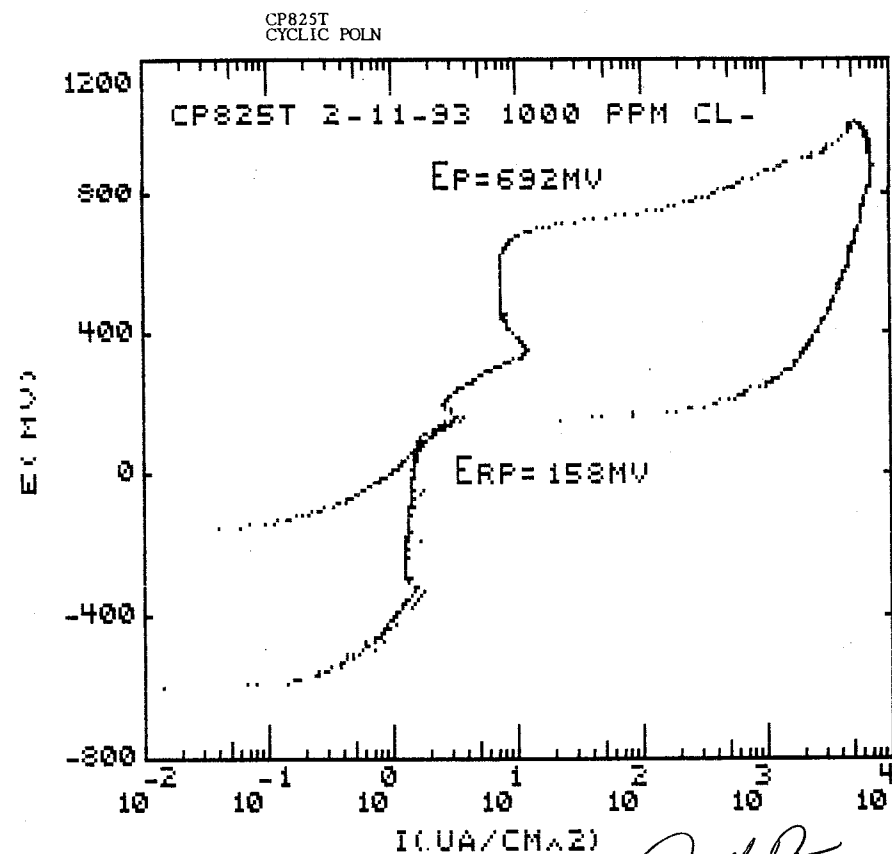
SOLUTION: 1000 PPM Cl^- 85 PPM NaCO_3 20 PPM SO_4^{2-}
 10 PPM NO_3^- 2 PPM F- 1000 ml AS FOLLOWS
 1.64886 g NaCl LOT 922649A
 0.11827 g NaHCO_3 LOT 897789
 20 ml STOCK SOLUTION SO_4^{2-} -2/93
 10 ml STOCK SOLUTION NO_3^- -2/93
 2 ml STOCK SOLUTION F-2/93
 STOCK SOLUTIONS P 138

$T = 95^\circ\text{C}$ N_2 THERMO 0323 007 CAL 2/2/93
 ARGON PURGED

POTENTIOSTAT EG & G MODEL 173 WITH
 M 342C SOFTWARE DATA SAVED AS
 CP825T WITH COMPAQ 386/20

REFERENCE FISHER SCE 13-620-S1 SN 0165415
 $E_{\text{CORR}} = -595 \text{ mV}$ KEITHLEY 614 CAL 1/28/93
 $E_{\text{PT}} = -229 \text{ mV}$ " "
 PH START 8.196
 PH END 9.639
 START WT 4.41949 g
 END WT NOT RECORDED

[Signature]
 2/11/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CP825T
INITIAL E (MV)	0 VS E
VERTEX E (MV)	100 VS R
FINAL E (MV)	0 VS E
SCAN RATE (MV/S)	.17
THRESHOLD I (UA/CM ²)	5000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM ²)	2.8
EQ WT (GM)	PASS
DENSITY (GM/CM ³)	PASS
CATHODIC TAPEL (MV)	PASS
ANODIC TAPEL (MV)	PASS

DATA SCALE

ECORR	-594
MV/PT	4
DATA MAX	7321.429
DATA MIN	1.428571E-02
ABS MIN	1.428571E-02
ABS MAX	7321.429

CP825T ALLOY 825 HH4371FG
2.80 CM² 600 SIC
T=95 C ARGON PURGED
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2PPM F

2/11/93

2/12/93

CYCLIC POLARIZATION CP910D

SPECIMEN ALLOY 825 HH4371FG 600 SIC

FINISH CLEANED IN DI WATER
AND ACETONE & DRIED. PLACED 7/25/94
IN OVEN AT 300°C FOR 24 HRS 10 DAYS
WT ORIGINAL 4.56870 g

WT AFTER 10 DAYS 4.56751 g

SOLUTION SAME AS CP825T P139

START PN 8.196

END PN 9.696

N₂ THERMO 0323007 95°C

ARGON PURGED

POTENTIOSTAT SAME AS CP825T DATA

SAVED USING M342C AS ~~CP910D~~ 7/25/94

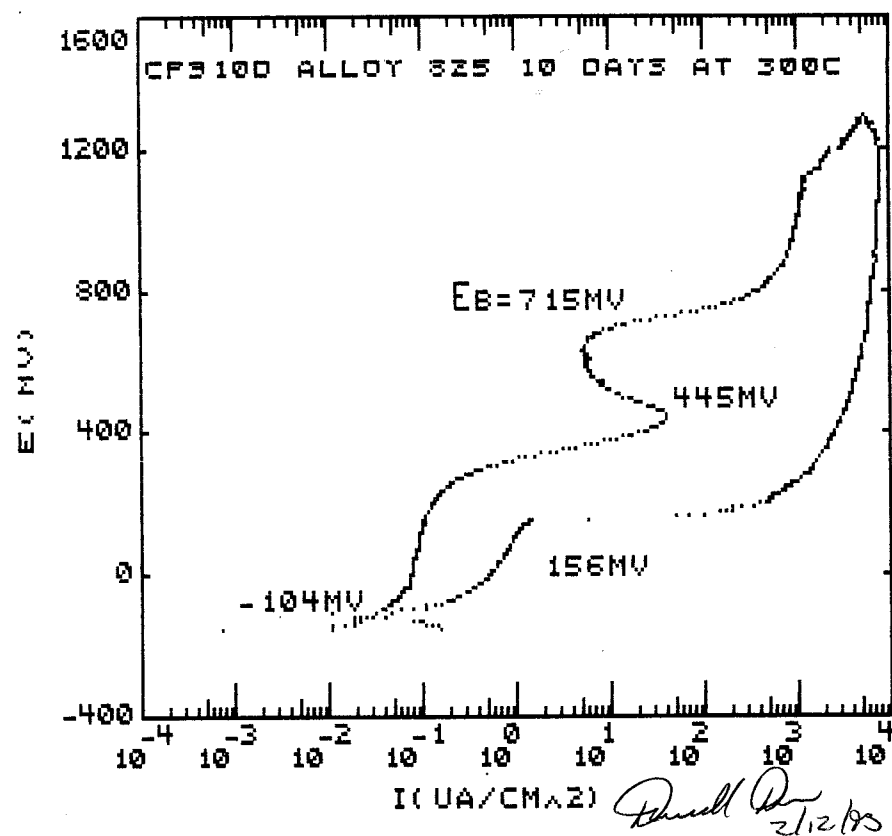
CP910D

REFERENCE FISHER SCG 13-620-51 SN 0165415

ECORR -151 mV SCE KEITHLEY 614

EPT -107 mV SCE

2/12/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CP910D
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(uA/cm²)	5000
CONDITION E(MV)	PASS
CONDITION I(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS²)	2.8
EQ WT(GM)	PASS
DENSITY(GM/CM³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-152
MV/PT	4
DATA MAX	8178.572
DATA MIN	-1642857
ABS MIN	7.142857E-04
ABS MAX	8178.572

CP910D HH4371FG 10 DAYS @ 300 C
2.80 CM² 600 SIC
T=95 C ARGON PURGED
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2PPM F

2/12/93

2/12/93

CYCLIC POLARIZATION

CP 10 10 D

SPECIMEN ALLOT 825 HN 4371FG 600SIC
CLEANED IN ULTRASONIC BATH WATER
AND ACETONE $l = 0.750$ $d = 0.2418$
PLACED IN OVEN AT 100°C FOR 10 DAYS
WET AREA = 2.80 cm²
START WT = 4.50187g
AFTER 10 DAYS 4.50186g
END WT. NOT RECORDED

SOLUTION 1000 PPM CL⁻ 85 PPM NCO₃ 20 PPM SO₄⁻
10 PPM NO₃⁻ 2 PPM F⁻
1.64991 g NaCl LOT 922649A
0.11846 g NaHCO₃ LOT 897789
20 ml STOCK SOLUTION SO₄-2/93
10 ml STOCK SOLUTION NO₃-1/93
2 ml STOCK SOLUTION F-1/93

STOCK SOLUTIONS P138

T = 95°C N₂ THERMO # 0323007

PURGED WITH ARGON

START PH 8.158

END PH 9.614

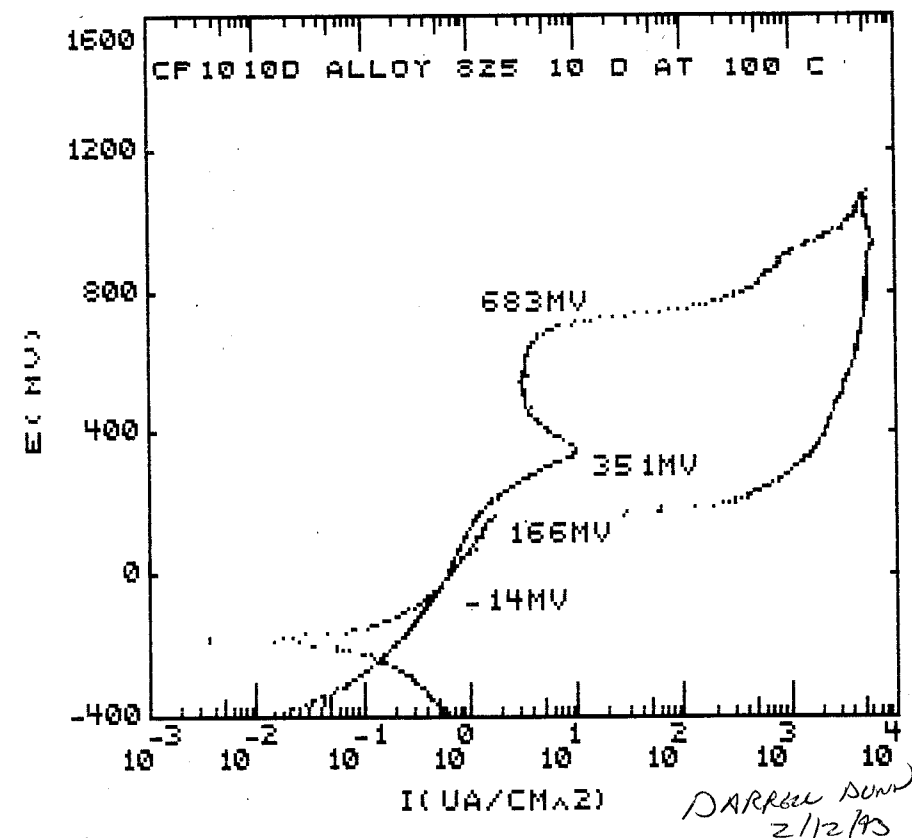
POTENTIOSTAT EG&G MODEL 173 USING

PARC M342C SOFTWARE DATA SAVED

AS CP1010D

REFERENCE SCE 13-620-SI SN 0165415

 $E_{CORR} = -400.7$ mV KEITHLEY 614 $E_{PT} = -275$ mV*2/12/93*

CP1010D
CYCLIC POLN

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CP1010D
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I (uA/cm ²)	5000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS ²)	2.8
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-398
MV/PT	4
DATA MAX	6157.143
DATA MIN	-6178572
ABS MIN	.0025
ABS MAX	6157.143

CP1010D H14371FG 10 DAYS @ 300 C
2.80 CM² 600 SIC
T=95 C ARGON PURGED
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2PPM F

[Signature]
2/12/93

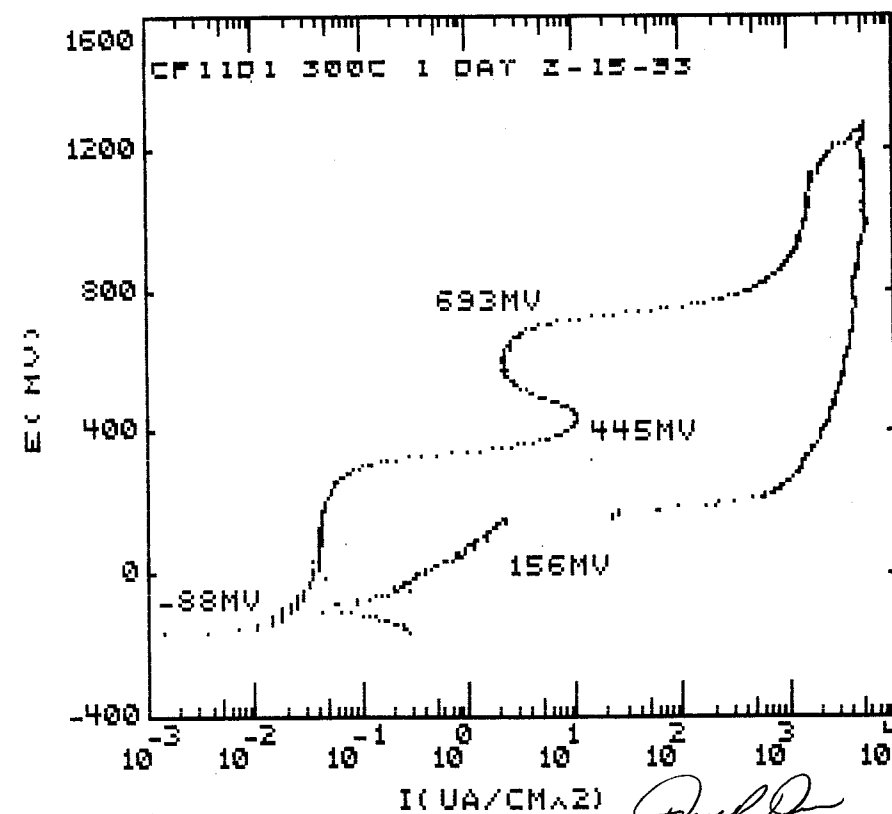
2/15/93 CYCLIC POLARIZATION CP11D1

SPECIMEN ALLOY 825 600 SIC HN 4371FG
CLEANED IN ULTRASONIC BATH RINSED
IN DI WATER ACETONE & DRIED
PLACED IN OVEN AT 300 °C FOR
24 hr $l = 0.753"$ $d = 0.251$
WET AREA = 2.8 cm²
START WT: 4.45495
AFTER 300 °C 24 hr: 4.45485
END WT: 4.43747 g

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃ 20 PPM SO₄²⁻
10 PPM NO₃⁻ 2 PPM F⁻ ED AS FOLLOWS
3.29749 g NaCl LOT 922649A
0.23704 g NaHCO₃ LOT 897789
20 ml STOCK SOLUTION NO₃-2/93
40 ml STOCK SOLUTION SO₄-2/93
4 ml STOCK SOLUTION F-2/93
+ DI WATER TO 2000 ml
STOCK SOLUTIONS P 138
START PN 8.116
END PN 9.769
T=95 °C ARGON PURGED N₂ THERMO #0323067
POTENTIOSTAT: SAME AS CP1010D P143 DATA
SAVED AS CP11D1
REFERENCE SCE FISHER 13-620-51 SN 0165415
E_{corr} = -158 mV SCE REITNLEY 617
E_{pt} = -86 mV SCE " "

[Signature] 2/16/93

CP11D1
CYCLIC POLN



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CP11D1
INITIAL E (mV)	0 VS E
VERTEX E (mV)	100 VS R
FINAL E (mV)	0 VS E
SCAN RATE (mV/S)	.16
THRESHOLD I (uA/cm^2)	5000
CONDITION E (mV)	PASS
CONDITION T (S)	PASS
INIT DELAY (mV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CMS^2)	2.8
EO WT (GM)	PASS
DENSITY (GM/CM^3)	PASS
CATHODIC TAFEL (MV)	PASS
ANODIC TAFEL (MV)	PASS

DATA SCALE

ECORR	-164
MV/PT	4
DATA MAX	5771.429
DATA MIN	-73.14286
ABS MIN	1.428571E-03
ABS MAX	5771.429

LEGEND

CP11D1 ALLOY 825 300 C 24 HR
HH4371FG 600 SIC
1000 PPM CL 85 PPM HCO3
20 PPM SO4
10 PPM NO3
2PPM F
95 C ARGON PURGED
2-15-93

David D
2/16/93

David D
2/16/93

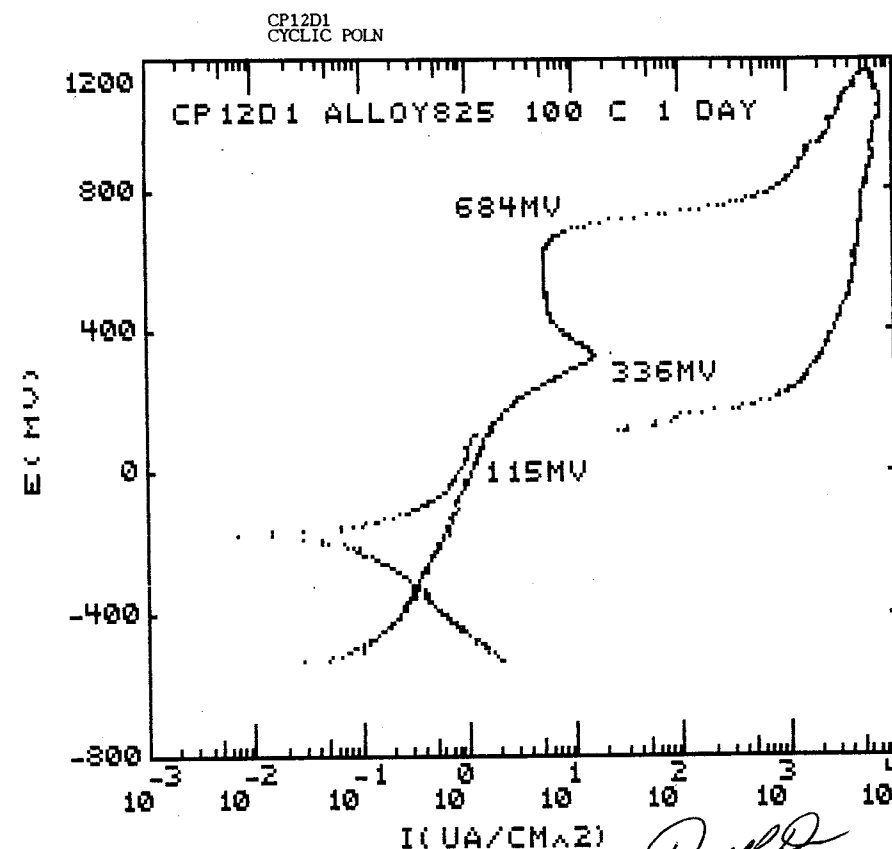
2/16/93 CP12D1 CYCLIC POLARIZATION

SPECIMEN = SAME PREPARATION AS CP11D1
P145 EXCEPT 100°C FOR 24 HR
 $l = 0.754$ $d = 0.250$ WET AREA = 2.8 cm²
START WT 4.48065
AFTER 100°C: 4.48068
END WT.

SOLUTION: SAME AS CP11D1 P145
START PH 8.120
END PH 9.823
T = 95°C ARGON PURGED
H₂ THERMO 0323007
POTENTIOSTAT SAME AS CP1010A P 143 DATA
SAVED AS CP12D1 USING M342C
SOFTWARE

REFERENCE SEE FISHER B-620-S1 SN 0165415
ECORR = -534 mV KEITHLEY 617
EPT = -125 mV " "

David D
2/16/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CP12D1
INITIAL E (mV)	0 VS E
VERTEX E (mV)	100 VS R
FINAL E (mV)	0 VS E
SCAN RATE (mV/S)	.16
THRESHOLD I (μA/CM²)	5000
CONDITION E (mV)	PASS
CONDITION T (S)	PASS
INIT DELAY (mV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM²)	2.8
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAPEL (mV)	PASS
ANODIC TAPEL (mV)	PASS

DATA SCALE

EOORR	-533
mV/PT	4
DATA MAX	7714.286
DATA MIN	-73.14286
ABS MIN	0
ABS MAX	7714.286

LEGEND

CP12D1 ALLOY 825 100 C 24 HR
 IN 4371FG 600 SIC
 1000 PPM CL 85 PPM HCO₃
 20 PPM SO₄
 10 PPM NO₃
 2 PPM F
 95 C ARGON PURGED
 2-15-93

Druid
2/16/93

2/17/93

ALLOY 825

CR DEPLETED

CRSDID

CYCLIC POLN.

SPECIMEN

ALLOY 825 NN4371FG MILL FINISH

SURFACES SAME AS 825CRY P126

3.22 CM² CR DEPLETED

5.11 CM² 600 SIC

CLEANED IN ULTRASONIC BATH RINSED IN

WATER & ACETONE AND DRIED PLACED

IN OVEN FOR 10 DAYS AT 300°C

START WT

NOT RECORDED

AFTER 300°C FOR 10 DAYS

AFTER SCAN #1

AFTER SCAN #2

AFTER SCAN #3

SOLUTION

1000 PPM CL 85 PPM HCO₃ 20 PPM SO₄10 PPM NO₃ 2 PPM F 2 L AS FOLLOWS

3.29674g NaCl LOT 922649A

0.23754g NaHCO₃ LOT 89778420 ml STOCK SOLUTION SO₄-2/9310 ml STOCK SOLUTION NO₃-2/93

2 ml STOCK SOLUTION F-2/93

+ DI WATER TO 2000 ml

STOCK SOLUTIONS P 138

POTENTIOSTAT SAME AS CP 1010 P 143 DATA

SAVED AS CP5DID

USING M342C SOFTWARE.

REFERENCE SEE FISHER 13-620-51 0165415

CRSDID E_{corr} -473 mV E_{PT} -72 mV RESISTANCE 617

START PH: 8.118 END PH:

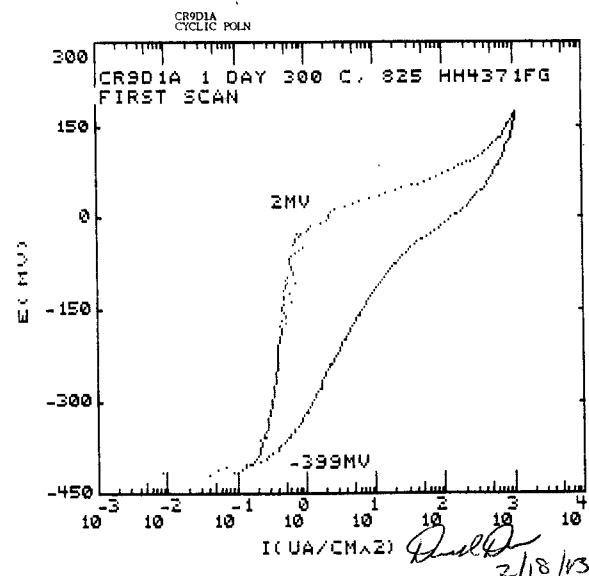
DATA LOST ERROR LINE 18xxx? IN

M 342C SOFTWARE SOME HISTORIES PRESENT

E B 100 mV SCE SPECIMEN SONICATED

AND EXAMINED FOR PITS.

Druid
2/18/93



RUN PARAMETERS

TECHNIQUE	CR9D1A
ORIGINAL NAME	CR9D1A
INITIAL E (MV)	0 VS E
FINAL E (MV)	100 VS R
SCAN RATE (MV/S)	0 VS E
THRESHOLD I (UA/CM²)	1000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM²)	8.33
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAPEL (MV)	PASS
ANODIC TAPEL (MV)	PASS

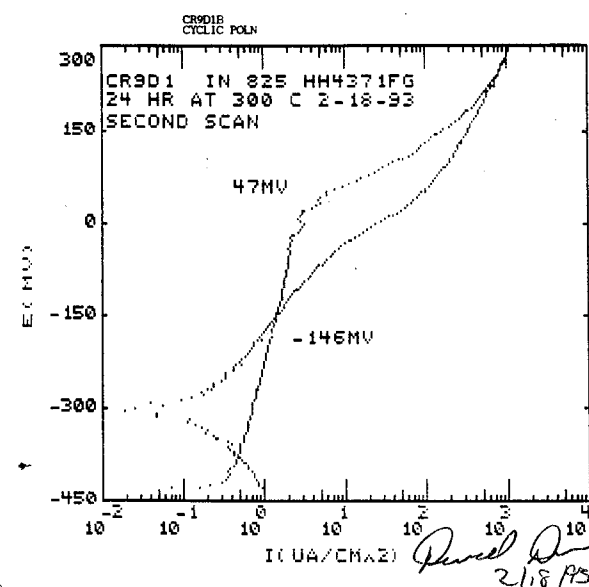
DATA SCALE

ECORR	-419
MV/PT	4
DATA MAX	1112.845
DATA MIN	-245.8584
ABS MIN	8.403362E-03
ABS MAX	1112.845

LEGEND

CR9D1 CR DEP 825 HH 4371FG 2-18-93
300 C FOR 24 HR 3.22 CM² CR DEP
5.11 CM² 600 SIC
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED

2/18/93



RUN PARAMETERS

TECHNIQUE	CR9D1B
ORIGINAL NAME	CR9D1B
INITIAL E (MV)	0 VS E
FINAL E (MV)	100 VS R
SCAN RATE (MV/S)	0 VS E
THRESHOLD I (UA/CM²)	1000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM²)	8.33
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAPEL (MV)	PASS
ANODIC TAPEL (MV)	PASS

DATA SCALE

ECORR	-438
MV/PT	4
DATA MAX	1042.017
DATA MIN	-9315726
ABS MIN	1.920768E-02
ABS MAX	1042.017

LEGEND

CR9D1 CR DEP 825 HH 4371FG 2-18-93
300 C FOR 24 HR 3.22 CM² CR DEP
5.11 CM² 600 SIC
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED

2/18/93



RUN PARAMETERS

TECHNIQUE	CR9D1C
ORIGINAL NAME	CR9D1C
INITIAL E (MV)	0 VS E
FINAL E (MV)	100 VS R
SCAN RATE (MV/S)	0 VS E
THRESHOLD I (UA/CM²)	1000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM²)	8.33
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAPEL (MV)	PASS
ANODIC TAPEL (MV)	PASS

DATA SCALE

ECORR	-368
MV/PT	4
DATA MAX	1140.456
DATA MIN	-6890756
ABS MIN	0.240096
ABS MAX	1140.456

LEGEND

CR9D1 CR DEP 825 HH 4371FG 2-18-93
300 C FOR 24 HR 3.22 CM² CR DEP
5.11 CM² 600 SIC
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED

2/18/93

2/18/93

CR9D1 A,B,C CYCLIC POLN 300°C 1N

SPECIMEN ALLOY 825 MILL FINISH (CR DEPLETED)
HH4371FG CLEANED IN ULTRASONIC BATH
WATER AND ACETONE & DRIED PLACED
IN OVEN AT 300°C FOR 24 hr.
5.11 CM² 600 S.C
3.22 CM² CR DEPLETED 7/25/94
START WT ~~25.01772g~~ 25.01772g
AFTER 300°C 1 DAY 25.01748g
AFTER SCAN #1 25.01529g
AFTER SCAN #2 25.01297g
AFTER SCAN #3 NOT RECORDED

SOLUTION 1000 PPM CL- 85 PPM HCO₃ 20 PPM SO₄
10 PPM NO₃ 2 PPM F- SAME AS CR9D10
P149 T=95°C ARGON PURGED
START PH 8.190
END PH SCAN #1 9.934
" " SCAN #2 9.854
" " SCAN #3 9.994

POTENTIOSTAT SAME AS CP10100 P143 DATA
SAVED AS CR9D1A, CR9D1B, CR9D1C
USING M342C SOFTWARE

REFERENCE SC6 FISHER 13-620-S1 SN 9214083
SCAN EORR -416 mV RETNLEY 614
EPT -99 mV " "
SCAN 2 (A) EORR -428 mV " "
EPT -129 mV " "
SCAN 3 (C) EORR -359 mV " "
EPT -56 mV " "

2/19/93

RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTICAL E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
CR6D10B
0 VS E
100 VS R
0 VS E
1
1000
PASS
PASS
300 S

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAPEL(MV)
ANODIC TAPEL(MV)

8.33
PASS
PASS
PASS
PASS

DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-386
4
1055.222
-8811222
3.681441E-03
1055.222

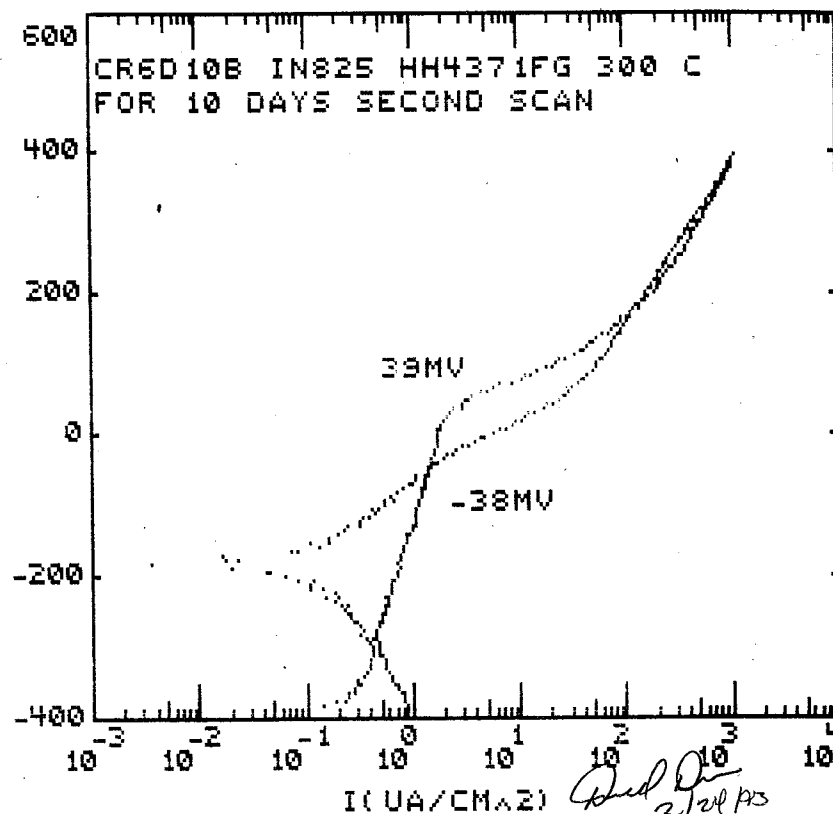
RESULTS

E(I=0)(MV)
CATHODIC TAPEL(MV)
ANODIC TAPEL(MV)
I-CORR(UA/CM²)
CORR RATE(MPY)
E(I=0)(MV)
POL RES.(K-OHMS CM²)
I-CORR(UA/CM²)
CORR RATE(MPY)

LEGEND

CR6D10B IN 825 HH4371FG 2-24-93
300 C FOR 10 DAYS 3.22 CM² CR DEP
5.11 CM² 600 SIC
1000 PPM CL
85 PPM HCO₃⁻
20 PPM SO₄²⁻
10 PPM NO₃⁻
2 PPM F⁻
95 C ARGON PURGED

Paul D
2/24/93



RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E(MV)
VERTICAL E(MV)
FINAL E(MV)
SCAN RATE(MV/S)
THRESHOLD I(UA/CM²)
CONDITION E(MV)
CONDITION T(S)
INIT DELAY(MV/S OR S)

CYCLIC POLN
CR6D10A
0 VS E
100 VS R
0 VS E
1
1000
PASS
PASS
300 S

SAMPLE PARAMETERS

AREA(CMS²)
EQ WT(GM)
DENSITY(GM/CM³)
CATHODIC TAPEL(MV)
ANODIC TAPEL(MV)

8.33
PASS
PASS
PASS
PASS

DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-506
4
1066.026
-1.388956
3.681441E-03
1066.026

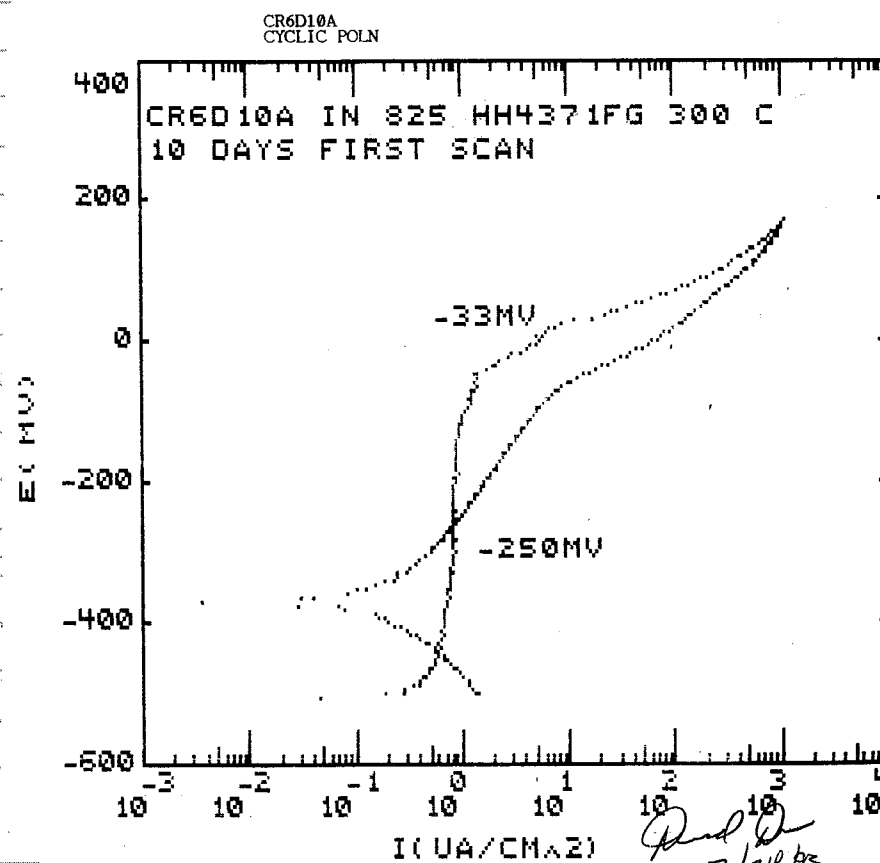
RESULTS

E(I=0)(MV)
CATHODIC TAPEL(MV)
ANODIC TAPEL(MV)
I-CORR(UA/CM²)
CORR RATE(MPY)
E(I=0)(MV)
POL RES.(K-OHMS CM²)
I-CORR(UA/CM²)
CORR RATE(MPY)

LEGEND

CR6D10A IN 825 HH4371FG 2-24-93
300 C FOR 10 DAYS 3.22 CM² CR DEP
5.11 CM² 600 SIC
1000 PPM CL
85 PPM HCO₃⁻
20 PPM SO₄²⁻
10 PPM NO₃⁻
2 PPM F⁻
95 C ARGON PURGED

Paul D
2/24/93



2/24/93

CR6D10 A,B,C,D CYCLIC POLN

SPECIMEN SAME AS CR5D10 P149

MILL FINISHED ALLOY 825 HH4371FG

CLEANED IN ULTRASONIC BATH WATER

AND ALGONG THEN DRIED. PLACED

IN OVEN AT 300°C FOR 10 DAYS

START WT: ~~23.88394g~~ 23.88645g

AFTER 300°C: 23.88394g

SCAN 1: NOT RECORDED

SCAN 2: 23.87911g

SCAN 3: 23.87618g

SCAN 4: 23.87043g

AREA = 8.33 cm² 5.11 cm² 600 SIC3.22 cm² CR DEPLETEDSOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃⁻ 20 PPM SO₄²⁻
10 PPM NO₃⁻ 2 PPM F⁻ 2000 ml AS FOLLOWS

3.29600g NaCl LOT 922649A

0.23891g NaHCO₃ LOT 89778940 ~~40~~ ml STOCK SOLUTION SO₄-2/9320 ml STOCK SOLUTION NO₃-2/93

4 ml STOCK SOLUTION F-2/93

+ DI WATER TO 2000 ml T=95°C

STOCK SOLUTIONS P 138

POTENTIOSTAT SAME AS CP1010 D P143 DATA SAVED

AS CR6D10A CR6D10B, CR6D10C

USING M342C SOFTWARE *Paul D* 7/25/94

REFERENCE FISHER SC6 13-620-51 SN-9204083 9214083

CR6D10 A START PN 8.205 END PN 10.13

ECORR -506 EPT -114 REITHLEY 617

CR6D10 B START PN 8.329 END PN 10.05

ECORR -383 mV EPT -279 mV

CR6D10 C ECORR -281 mV EPT -335 mV

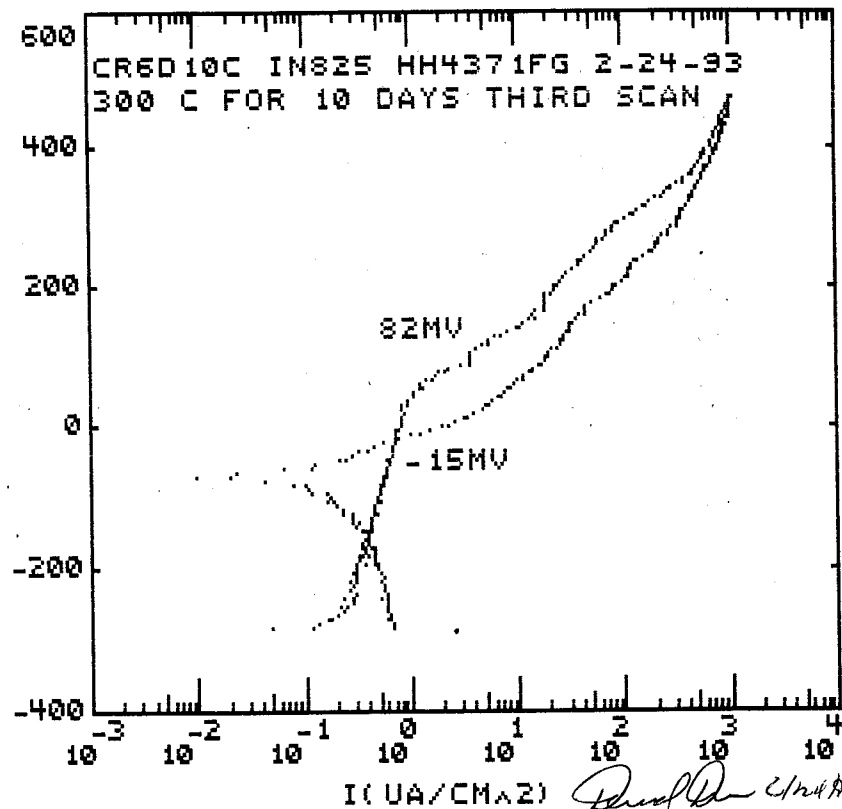
START PN 8.317 END PN 9.938

CR6D10 D ECORR -209 EPT -359 *Paul D* 7/25/94

START PN 8.240 END PN 9.610 9.924

PLOTS P 152 & 153

Paul D 2/24/93

CR6D10C
CYCLIC POLN

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR6D10C
INITIAL E (mV)	0 VS R
VERTEX E (mV)	0 VS E
FINAL E (mV)	17
SCAN RATE (mV/s)	1000
THRESHOLD (μA/cm²)	PASS
CONDITION E (mV)	PASS
CONDITION T (s)	PASS
INIT DELAY (mV/s OR s)	PASS

SAMPLE PARAMETERS

AREA (CM²)	8.33
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAPEL (mV)	PASS
ANODIC TAPEL (mV)	PASS

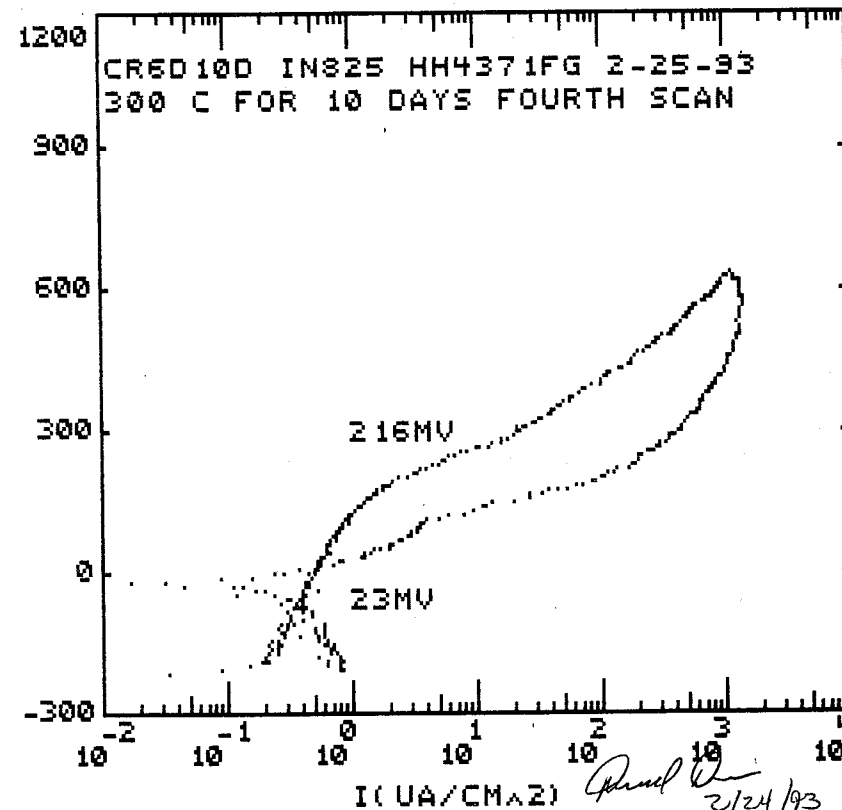
DATA SCALE

ECORR	-183
WV/PT	1062.425
DATA MAX	-0926771
DATA MIN	9.603841E-03
ABS MIN	1062.425
ABS MAX	

LEGEND

CR6D10C IN825 HH4371FG 2-24-93
300 C FOR 10 DAYS 3.25 CM² CR DEP
1.11 CM² 600 SIC
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED

Handwritten: 2/24/93

CR6D10D
CYCLIC POLN

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR6D10D
INITIAL E (mV)	0 VS E
VERTEX E (mV)	0 VS R
FINAL E (mV)	0 VS E
SCAN RATE (mV/s)	17
THRESHOLD (μA/cm²)	1000
CONDITION E (mV)	PASS
CONDITION T (s)	PASS
INIT DELAY (mV/s OR s)	PASS

SAMPLE PARAMETERS

AREA (CM²)	8.33
EQ WT (GM)	PASS
DENSITY (GM/CM³)	PASS
CATHODIC TAPEL (mV)	PASS
ANODIC TAPEL (mV)	PASS

DATA SCALE

ECORR	-109
WV/PT	1423.77
DATA MAX	-3211285
DATA MIN	1.658672E-02
ABS MIN	1423.77
ABS MAX	

LEGEND

CR6D10D IN825 HH4371FG 2-26-93
300 C FOR 10 DAYS 3.25 CM² CR DEP
1.11 CM² 600 SIC
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED

Handwritten: 2/24/93

2/25/93

CYCLIC POLN CP1D30

SPECIMEN ALLOT 825 HH4371FG 600 SIC
SPECIMEN CLEANED IN ULTRASONIC
BATH RINSED WITH WATER & ACETONE
AND DRIED $\ell = 0.750$ $d = 0.251$
WET AREA = 2.80 cm^2
SPECIMEN PLACED IN OVEN AT 300°C
FOR 30 DAYS. ~~7/25/94~~ 7/25/94
START WT ~~4.48~~ 4.44876g
AFTER 30 DAYS AT 300°C : 4.44848g
END WT. NOT RECORDED

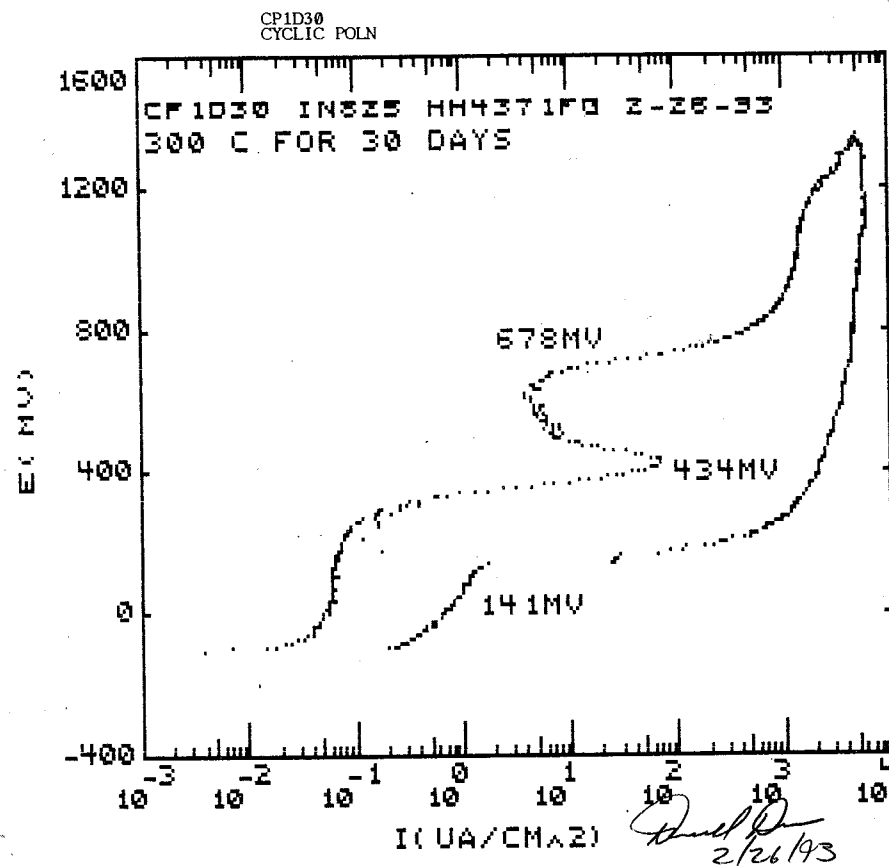
SOLUTION 1000 PPM CL⁻ 85 PPM HCO₃ 20 PPM SO₄⁻
10 PPM NO₃ 2 PPM F⁻ 1000 ml AS FOLLOWS
1.64999g NaCl LOT 922644A
0.11885g NaHCO₃ LOT 897789
20 ml STOCK SOLUTION ~~20-2/93~~ 20-2/93
10 ml STOCK SOLUTION NO₃-2/93
2 ml STOCK SOLUTION F-2/93
+ DI WATER TO 1000 ml
STOCK SOLUTIONS P 138
T = 45°C ARGON PURGED
START PH 8.240
END PH 9.610

POTENTIOSTAT SAME AS CP1010 D P143 DATA
SAVED AS CP1D30 USING M342C
SOFTWARE

REFERENCE SC6 FISHER 13-620-51 SN 9214083
ECORR -96mV KEITHLEY 614 CALDUE 1/28/94
EPT -278 mV

Handwritten: 2/26/93

2/26/93



RUN PARAMETERS

TECHNIQUE
ORIGINAL NAME
INITIAL E (mV)
VERTEX E (mV)
FINAL E (mV)
SCAN RATE (mV/s)
THRESHOLD I (uA/cm²)
CONDITION E (mV)
CONDITION T (s)
INIT DELAY (mV/s or s)

CYCLIC POLN
CP1D30
0 VS E
100 VS R
0 VS E
17
5000
PASS
PASS
300 S

SAMPLE PARAMETERS

AREA (cm²)
EQ WT (GM)
DENSITY (GM/cm³)
CATHODIC TAFEL (mV)
ANODIC TAFEL (mV)

2.8
PASS
PASS
PASS
PASS

DATA SCALE

ECORR
MV/PT
DATA MAX
DATA MIN
ABS MIN
ABS MAX

-99
4
6278.572
-73.14286
3.928571E-03
6278.572

LEGEND

CP1D30 IN825 HH4371FG 2-25-93
300 C FOR 30 DAYS
2.80 CM²
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED

2/26/93

2/26/93

CYCLIC POLARIZATION Cr DEPLETED 825 CR6

SPECIMEN: ALLOY 825 MILL FINISHED SURFACES
HH4371FG 3.22 cm² Cr DEPLETED
5.11 cm² 60 SiC ULTRASONICALLY
CLEANED IN ACETONE FOR 1 h
START WT: 24.29497 g
END WT: 24.28614 g AFTER SCAN B

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃ 20 PPM SO₄
10 PPM NO₃ 2 PPM F⁻ 2000 ml AS FOLLOWS
3.29629 g NaCl LOT 922649A
0.23844 g NaHCO₃ LOT 897789
40 ml ~~20 ml~~ STOCK SOLUTION SO₄-2/93
20 ml ~~10 ml~~ STOCK SOLUTION NO₃-2/93
4 ml ~~2 ml~~ STOCK SOLUTION F-2/93
+ DI WATER TO 2000 ml

START PH 8.277

END PH 9.898

T=95°C ARGON PURGED H₂ THERMO 0323007

POTENTIOSTAT SAME AS CP1010D P143 DATA SAVER

AS 825CR6A, 825CR6B USING

M342C SOFTWARE

REFERENCE SCE FISHER 13-620-51 SN 9214083

ECORR: -505 mV REBTNCT 614

EPT: -290 mV

825CR6B

3600 SEC DELAY

ECORR = -486 mV USING PARC 173/M342C

START PH 8.293

END PH 9.904

2/28/93

RUN PARAMETERS

TECHNIQUE	825CR6A
ORIGINAL NAME	825CR6A
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS E
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	17
THRESHOLD I(UA/CM ²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS ²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

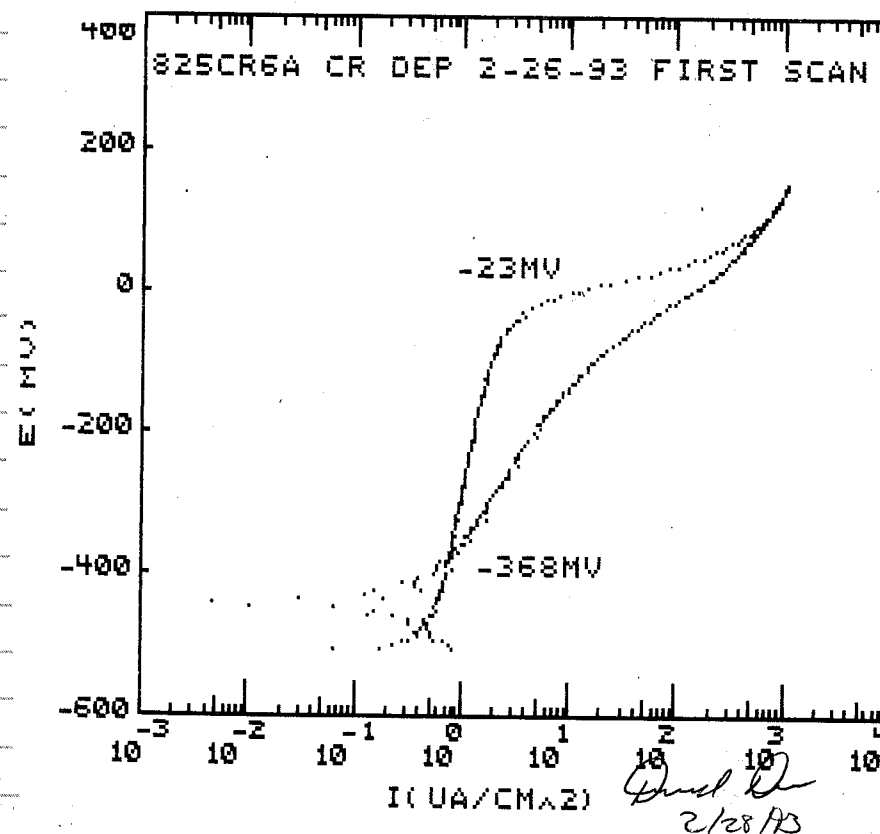
DATA SCALE

ECORR	-508
MV/PT	4
DATA MAX	1091.236
DATA MIN	-8483361
ABS MIN	4.801921E-03
ABS MAX	1091.236

LEGEND

825CR6A IN825 HH4371FG 2-26-93
3.22 CM2 CR DEP 5.11 CM2 60 SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2 PPM F
95 C ARGON PURGED

Paul D
2/28/93

825CR6B
CYCLIC POLN

RUN PARAMETERS

TECHNIQUE	825CR6B
ORIGINAL NAME	825CR6B
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS E
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	17
THRESHOLD I(UA/CM ²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS ²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

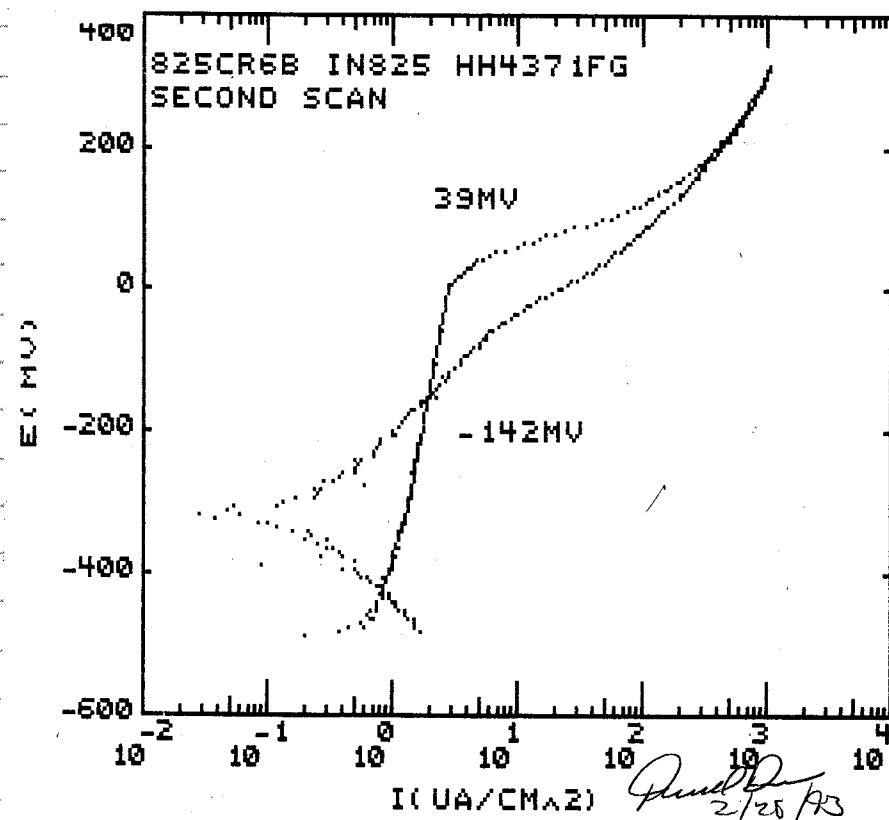
DATA SCALE

ECORR	-486
MV/PT	4
DATA MAX	1037.215
DATA MIN	-1.648239
ABS MIN	2.761105E-02
ABS MAX	1037.215

LEGEND

825CR6B IN825 HH4371FG 2-26-93
3.22 CM2 CR DEP 5.11 CM2 60 SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2 PPM F
95 C ARGON PURGED

Paul D
2/28/93



2/28/93 CYCLIC POLARIZATION 825 CR 7

SPECIMEN ALLOY 825 HH4371FG SAMPLE AS
825CR6 P157 3.22cm² CR DEPLETED
5.11cm² BULK COMPOSITION ULTRASONICALLY
CLEANED IN ACETONE FOR 1h
START WT 24.65061
END WT 24.64367

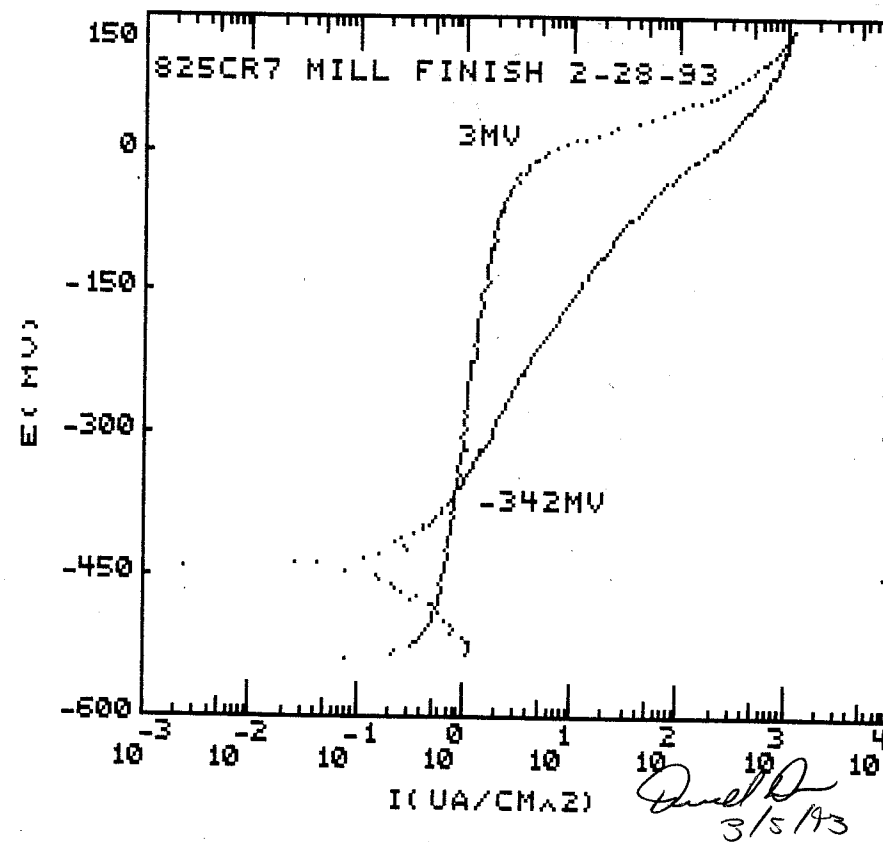
SOLUTION SAMPLE AS 825CR6 P157
START PN 8.209
END PN 10.06
T=95°C ARGON PURGED N₂ TAKAMO 0323007

POTENTIOSTAT SAME AS CP1000 P 143
DATA SAVER AS 825CR7 USING
PARC M342C SOFTWARE.

REFERENCE SC6 FISHER 13-620-51 SN 9214083
ECORR -538 PARC 173
EPT ≈ -200mV PRIOR TO TEST REITNLEY 614

Paul D 3/5/93

825CR7
CYCLIC POLN



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	825CR7
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	3600 S

SAMPLE PARAMETERS

AREA(CMS²)	0.33
EQ WT(GM)	PASS
DENSITY(GM/CM³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

ECORR	-538
MV/PT	1
DATA MAX	1129.652
DATA MIN	-245.6584
ABS MIN	2.40896E-03
ABS MAX	1129.652

LEGEND

825CR7 IN825 IN4371FG 2-28-93
3.22 CM² CR DEP 5.11 CM² 10 SIC
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED

Daniel D
3/5/93

2/28/98

CYCLIC POLARIZATION CP3D30

SPECIMEN ALLOY 825 IN4371FG PREPARED

SAMPLE AS CP1D30 P155

 $I_c = 0.750$ $d = 0.250$ WGT AREA = 2.80 cm^2

START WT 4.46367

AFTER 100°C FOR 30 DAYS 4.46355

END WT

SPECIMEN IN BLUE M OVEN AT 100°C

FOR 30 DAYS

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃ 20 PPM SO₄²⁻10 PPM NO₃ 2 PPM F⁻ 1000 ml MAKE AS FOLLOWS

1.64900g NaCl LOT 922649A

0.11955g NaHCO₃ LOT 89778920 ml STOCK SOLUTION SO₄-2/9310 ml STOCK SOLUTION NO₃-2/93

2 ml STOCK SOLUTION F-2/93

+ DI WATER TO 1000 ml STOCK

SOLUTIONS P138 T=95°C ARGON

PURGED

POTENTIOSTAT SAME AS CP1D10 P143 DATA

SAMPLE AS CP3D30 USING PARC M342C

SOFTWARE.

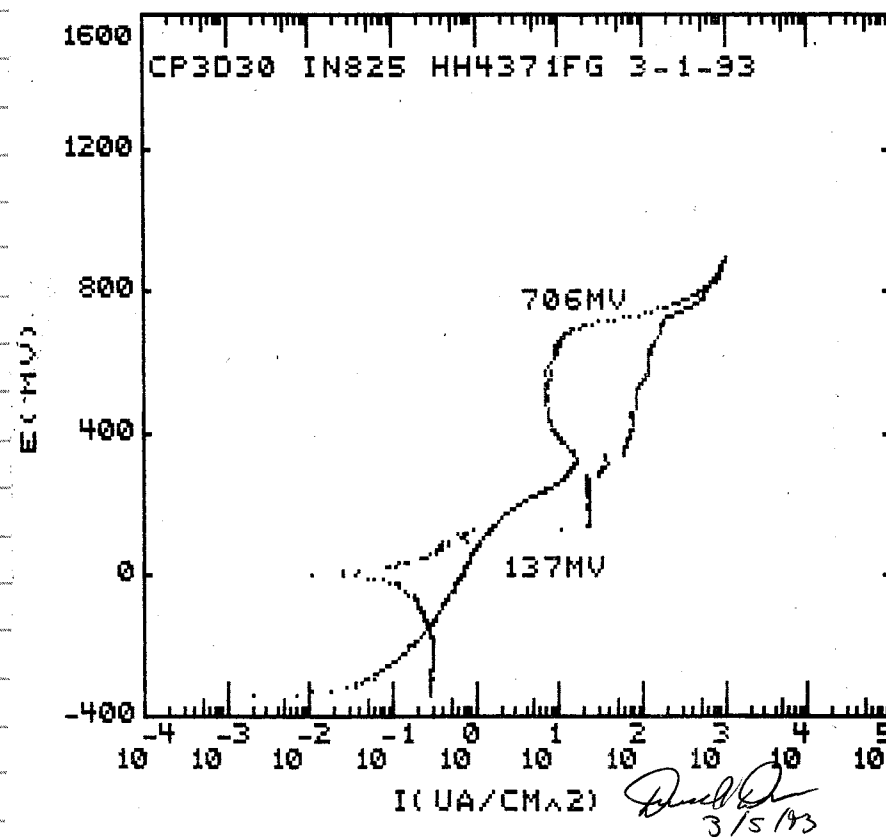
E_{corr}E_{PT} -310 mV REITML64 614

START PH 8.237

END PH 9.327

Daniel D
2/28/98

CP3D30
CYCLIC POLN



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CP3D30
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM ²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	3600 S

SAMPLE PARAMETERS

AREA(CMS ²)	2.8
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

EOORR	-339
MV/PT	4
DATA MAX	1010.714
DATA MIN	-.3071429
ABS MIN	0
ABS MAX	1010.714

LEGEND

CP3D30 IN825 HH4371FG 3-1-93
100 C FOR 30 DAYS
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED

D. D.
3/5/93

3/3/93

STOCK SOLUTIONS

SO₄ - 3/93 1000 PPM SO₄²⁻ AS Na₂SO₄
1.48310 g Na₂SO₄ LOT 901213 + WATER
TO 1000 ml EXP 4/2/93

NO₃ - 3/93 1000 PPM NO₃⁻ AS ~~NaNO₃~~ ^{7/25/94} NaNO₃
1.37156 g NaNO₃ LOT 897183 +
WATER TO 1000 ml EXP 4/2/93

F - 3/93 1000 PPM F⁻ AS NaF
2.21213 g NaF LOT 896405 +
WATER TO 1000 ml EXP 4/2/93

D. D.
3/5/93

3/3/93

OPEN CIRCUIT POTENTIAL MEASUREMENTS

SOLUTION 1000 PPM Cl^- 85 PPM NO_3^- 20 PPM SO_4^{2-}
 10 PPM NO_3^- 2 PPM F^- 2000 ml MARGAS SOLUTIONS
 3.29594 g NaCl LOT 922649A
 7/25/94 0.23867 g NaNO_3 LOT 897789
 40 ml STOCK SOLUTION SO_4^{2-} 3/93
 20 ml STOCK SOLUTION NO_3^- 3/93
 4 ml STOCK SOLUTION F^- 3/93
 (STOCK SOLUTIONS P 163) + DI WATER
 TO 2000 ml
 $T = 95^\circ\text{C}$ ZERO AIR PURGED
 (OXYGEN / NITROGEN NO CO_2)
 $\text{pH} = 8.23$

CP2D30 CYCLIC POLARIZATION SPECIMEN
 $l = 0.749$ " $d = 0.251$ WET AREA = 2.8cm^2
 PLACED IN OVEN AT 300°C FOR 30 DAYS
 START WT 4.50125 g
 AFTER 30 DAYS 4.49996 g
 $E_{\text{PT}} = +82\text{mV}$ $E_{\text{CORR}} = -48\text{mV}$ KEITNEL 617
 AFTER 1 hr IMMERSION.

CP4D30 CYCLIC POLARIZATION SPECIMEN
 $l = 0.750$ $d = 0.250$ WET AREA = 2.8cm^2
 PLACED IN OVEN AT ~~300~~ ¹⁰⁰ 100°C FOR 30 DAYS
 START WT 4.42465 g
 AFTER 100°C 4.42297 g
 $E_{\text{PT}} +71\text{mV}$ $E_{\text{CORR}} = -254\text{mV}$
 AFTER 65 min IMMERSION

CP5D10 CYCLIC POLARIZATION SPECIMEN
 $l = 0.750$ $d = 0.250$ WET AREA = 2.8cm^2
 PLACED IN OVEN AT 300°C FOR 10 DAYS
 START WT 4.49256 g
 AFTER 300°C 4.49214 g
 $E_{\text{PT}} +74\text{mV}$ $E_{\text{CORR}} = -31\text{mV}$ KEITNEL 617
 60 min IMMERSION

3/3/93

OPEN CIRCUIT POTENTIAL MEASUREMENTS

CP7D1 CYCLIC POLARIZATION SPECIMEN
 $l = 0.751$ $d = 0.248$ WET AREA = 2.80cm^2
 PLACED IN OVEN AT 300°C FOR 1 DAY
 START WT 4.43553 g
 AFTER 300°C 4.43540 g
 $E_{\text{PT}} +72.56\text{mV}$ $E_{\text{CORR}} = -59\text{mV}$ AFTER 60 min

CP6D10 CYCLIC POLARIZATION SPECIMEN
 $l = 0.750$ $d = 0.250$ WET AREA = 2.80cm^2
 PLACED IN OVEN AT 100°C FOR 10 DAYS
 START WT 4.43653 g
 END WT (AFTER 100°C) 4.43637 g
 $E_{\text{PT}} +71\text{mV}$ $E_{\text{CORR}} = -239\text{mV}$
 KEITNEL 617 AFTER 60 min

CP8D1 CYCLIC POLARIZATION SPECIMEN
 $l = 0.750$ $d = 0.250$ WET AREA = 2.80cm^2
 PLACED IN OVEN AT 100°C FOR 1 DAY
 START WT 4.39958 g
 END WT 4.39945 g
 $E_{\text{PT}} +70\text{mV}$ $E_{\text{CORR}} = -330\text{mV}$

END PN 9.50

[Signature]
 3/3/93

3/4/93

SOLUTION CHANGED HEATED TO 95°C
 PURGED w/ ZERO AIR (SAME SOLUTION STOCK
 AS BEFORE. P164)

CP825T2 CYCLIC POLARIZATION SPECIMEN
 $l = 0.750$ $d = 0.250$ WET AREA = 2.8cm^2
 600 SIC FINISH
 $E_{\text{CORR}} = -329\text{mV}$ $E_{\text{PT}} +74\text{mV}$

CR825T1 MILL FINISHED ALLOY 825
 60 GRIT BULK SURFACES
 $E_{\text{CORR}} = -254\text{mV}$ $E_{\text{PT}} +538\text{mV}$

[Signature]
 3/4/93

3/5/93

REST POTENTIAL MEASUREMENTS N_2/O_2 PURGE

CR11D1 ALLOY 825 NN4371FG MILL FINISH
 100°C FOR 1 DAY 8.33 cm^2 3.22 cm^2 CR DEP
 START WT 23.79776g
 END WT 23.79759g
 $E_{\text{CORR}} -283$ $E_{\text{PT}} +53.7$

~~CR10D1~~ 1/25/94
 CR10D1 ALLOY 825 NN4371FG MILL FINISH
 300°C FOR 1 DAY 8.33 cm^2
 3.22 cm^2 CR DEP
 START WT 25.38875g
 END WT 25.38857g
 $E_{\text{CORR}} -205$ $E_{\text{PT}} +56$

CR1D30 ALLOY 825 NN4371FG MILL FINISH
 300°C 30 DAYS 8.33 cm^2
 3.22 cm^2 CR DEP
 START WT 25.37279g
 END WT 25.37254g
 $E_{\text{CORR}} -241$ $E_{\text{PT}} +63$

CR7D10 ALLOY 825 NN4371FG MILL FINISH
 100°C 10 DAYS 8.33 cm^2
 3.22 cm^2 CR DEP
 START WT 25.22737g
 END WT 25.22716g
 $E_{\text{CORR}} -198$ $E_{\text{PT}} +60$

CR3D30 ALLOY 825 NN4371FG MILL
 FINISH 100°C 30 DAYS 8.33 cm^2
 3.22 cm^2 CR DEP
 START WT 24.48005g
 END WT 24.47982g
 $E_{\text{CORR}} -237$ $E_{\text{PT}} +50.7 \text{ mV}$

END PA 10.05

D. D. 3/5/93

3/5/93

OPEN CIRCUIT POTENTIAL MEASUREMENTS $N_2/O_2/N_2O_2$

SOLUTION SAME AS ON P164 EXCEPT
 TO 600 ml SOLUTION 0.33 ml 30.9%
 N_2O_2 ADDD END PN 8.388.

CP82ST2 600 S.C. NN4371FG ALLOY 825
 $E_{\text{CORR}} +131 \text{ mV}$ $E_{\text{PT}} 0 \text{ mV}$

CR82ST1 MILL FINISH NN4371FG ALLOY 825
 $E_{\text{CORR}} -153 \text{ mV}$ $E_{\text{PT}} +16 \text{ mV}$

CP2D30 600 S.C. NN4371FG ALLOY 825
 300°C 30 DAYS
 $E_{\text{CORR}} +190$ $E_{\text{PT}} 0 \text{ mV}$

CP4D30 600 S.C. NN4371FG ALLOY 825
 100°C 30 DAYS
 $E_{\text{CORR}} +108 \text{ mV}$ $E_{\text{PT}} +6 \text{ mV}$

D. D. 3/5/93

3/8/93 REST POTENTIALS SAME SOLUTION AS
 ABOVE MADE FRESH

CP5D10 600 S.C. NN4371FG ALLOY 825
 300°C 10 DAYS
 $E_{\text{CORR}} +199 \text{ mV}$ $E_{\text{PT}} +5 \text{ mV}$

CP7D1 600 S.C. NN4371FG ALLOY 825
 300°C 1 DAY
 $E_{\text{CORR}} +220 \text{ mV}$ $E_{\text{PT}} +7.6 \text{ mV}$

D. D. 3/8/93

3/8/93

OPEN CIRCUIT POTENTIAL MEASUREMENTS

CPLD10 ALLOY 825 600 SiC ~~NN4371FG~~ ^{NN4371FG} ~~1/25/94~~
 100 °C 10 DAYS
 $E_{CORR} = +115 \text{ mV}$ $E_{PT} = 4 \text{ mV}$

CR1D30 ALLOY 825 MILL FINISH NN4371FG
 300 °C 30 DAYS
 $E_{CORR} = 0 \text{ mV}$ $E_{PT} = +16 \text{ mV}$

CR1D1 ALLOY 825 MILL FINISH NN4371FG
 300 °C 1 DAY
 $E_{CORR} = -9 \text{ mV}$ $E_{PT} = +10 \text{ mV}$

CR3D30 ALLOY 825 MILL FINISH NN4371FG
 100 °C 30 DAYS
 $E_{CORR} = -60 \text{ mV}$ $E_{PT} = +8 \text{ mV}$

CR11D1 ALLOY 825 MILL FINISH NN4371FG
 100 °C 1 DAY
 $E_{CORR} = -15 \text{ mV}$ $E_{PT} = 8 \text{ mV}$

CR7D10 ALLOY 825 MILL FINISH NN4371FG
 100 °C 10 DAYS
 $E_{CORR} = -114 \text{ mV}$ $E_{PT} = +15 \text{ mV}$

Paul R.
 3/8/93

3/11/93

CYCLIC POLARIZATION CR2D30

SPECIMEN ALLOY 825 NN4371FG MILL FINISHED
 SURFACES 3.22 cm² C_A DEP 5.11 cm²
 600 SiC THERMALLY TREATED AT
 300 °C FOR 30 DAYS
 START WT 25.20464
 AFTER 30 DAYS 25.20493
 SCAN 1 25.20570, SCAN 2 25.19953,
 SCAN 3

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃⁻ 20 PPM SO₄²⁻
 10 PPM NO₃⁻ 2 PPM F⁻ 2000 PPM FOLLOWS
 3.29779g NaCl LOT 922649A
 0.23833g NaHCO₃ LOT 897789
 40 ml STOCK SOLUTION SO₄²⁻ 3/93
 20 ml STOCK SOLUTION NO₃⁻ 3/93
 4 ml STOCK SOLUTION F⁻ 3/93
 + DI WATER TO 2000 ml
 STOCK SOLUTIONS P 163

POTENTIOSTAT PARC MODEL 173 SAME AS CPLD10
 P143 DATA SAVER USING
 M342C SOFTWARE AS CR2D30
 CR2D30B CR2D30C CR2D30D CR2D30E

REFERENCE FISHER SC6 13-620-S1 SN 9214083
 T = 95 °C ARGON PURGED

CR2D30 $E_{CORR} = -473$ pH START: 8.230
 $E_{PT} = -12$ pH END: 9.92

CR2D30B $E_{CORR} = -480$ pH START 8.230
 $E_{PT} = -239$ pH END = 10.014

CR2D30C $E_{CORR} = -336 \text{ mV}$ pH START 8.230
 $E_{PT} = -200 \text{ mV}$ pH END 9.690

CR2D30D $E_{CORR} = -329 \text{ mV}$ pH START 8.230
 $E_{PT} = -183 \text{ mV}$ pH END 9.528

CR2D30E $E_{CORR} = -281$ START pH 8.230
 $E_{PT} = -133.6$ END pH 9.978

PLOTS P 172-172-173

Paul R. 3/11/93

3/11/93

CYCLIC POLARIZATION CR810D

SPECIMEN ALLOY 825 HH4371FG MILL

FINISHED SURFACES

PLACED IN OVEN AT 100°C FOR 10 DAYS

SOLUTION 1000 PPM Cl^- 85 PPM NaCO_3 20 PPM SO_4^{2-}
10 PPM NO_3^- 2 PPM F^- 3.297 g NaCl LOT 922649A0.238 g NaHCO_3 LOT 89778940 ml SO_4 - 3/9320 ml NO_3 - 3/93
~~10 ml F^- - 3/93~~4 ml F^- - 3/93

+ DI WATER TO 2000 ml

STOCK SOLUTIONS P 163

POTENTIOSTAT PARC173 SAME AS CP1010D

P143 DATA SAVER USING M342C

SOFTWARE AS CR8D10

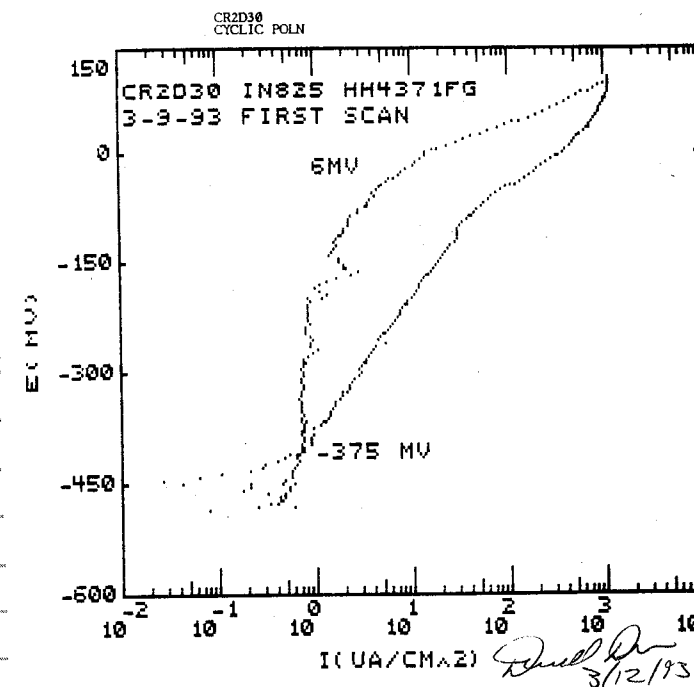
REFERENCE SCE FISHER 13-620-S1 SN 9214083

T = 95°C ARGON PURGED

CR8D10 E_{CORR} -417 mV START PN 8.217 E_{PT} -91 mV END PN 9.950CR8D10B E_{CORR} -428 mV START PN 8.231 E_{PT} -83 mV END PN NOT RECORDED

D. D. 3/12/93

PLOTS P 173-174-175



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR2D30
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS E
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	5
THRESHOLD I(UA/CM^2)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS^2)	EQ WT(GM)
8.33	PASS
DENSITY(GM/CM^3)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

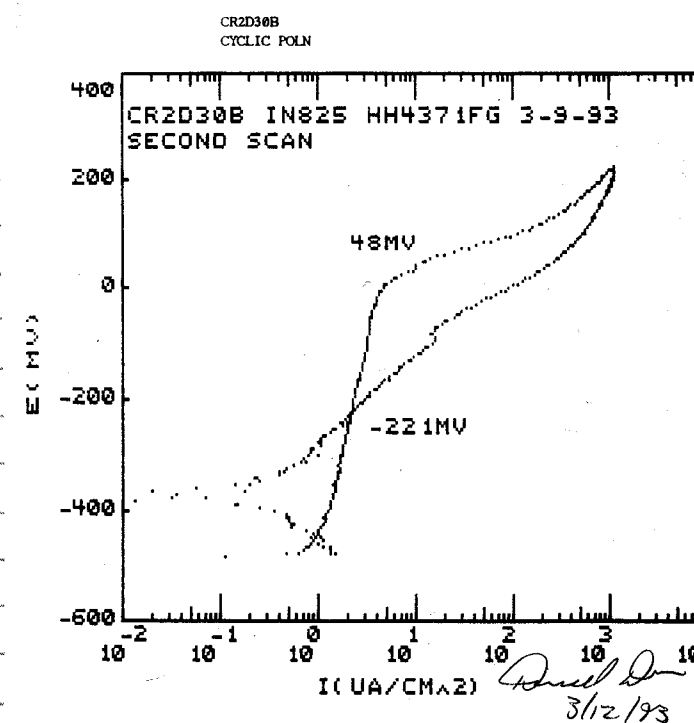
DATA SCALE

ECORR	MV/PT
-483	4
DATA MAX	1146.459
DATA MIN	-5834334
ABS MIN	2.641050E-02
ABS MAX	1146.459

LEGEND

CR2D30 HH4371FG IN825 3-9-93
30 DAYS AT 300 C 3.22 CM2 CR DEP
5.11 CM2 600SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2 PPM F
95 C ARGON PURGED FIRST SCAN

D. D. 3/12/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR2D30B
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS E
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	5
THRESHOLD I(UA/CM^2)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS^2)	EQ WT(GM)
8.33	PASS
DENSITY(GM/CM^3)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

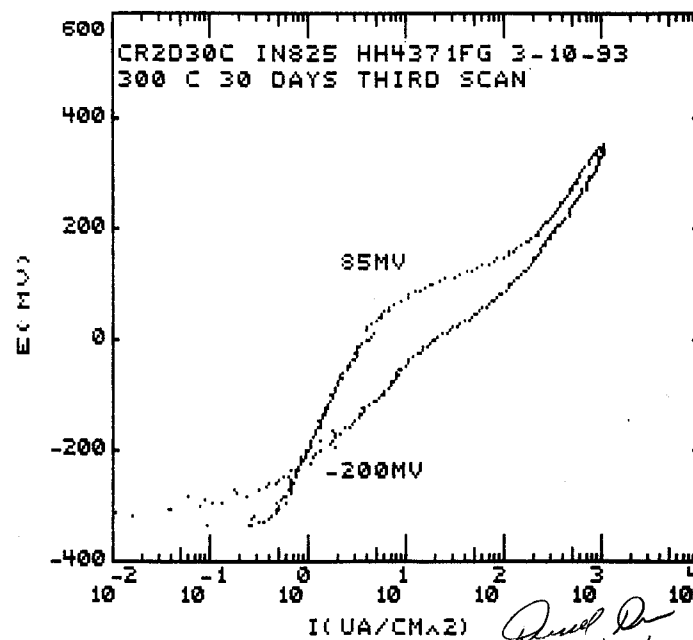
ECORR	MV/PT
-481	4
DATA MAX	1112.845
DATA MIN	-1.471789
ABS MIN	1.328528E-02
ABS MAX	1112.845

LEGEND

CR2D30B HH4371FG IN825 3-9-93
30 DAYS AT 300 C 3.22 CM2 CR DEP
5.11 CM2 600SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2 PPM F
95 C ARGON PURGED 2ND SCANN

D. D. 3/12/93

CR2D30C
CYCLIC POLN



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR2D30C
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	3000 S

SAMPLE PARAMETERS

AREA(CMS²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

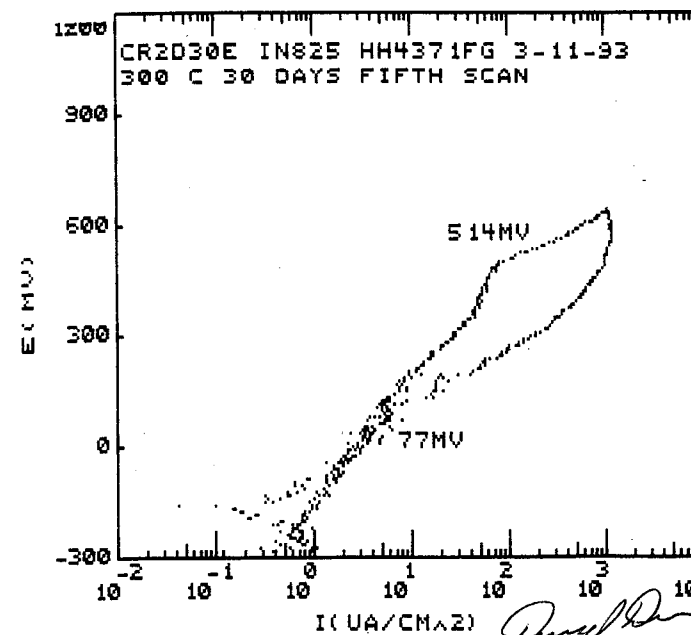
ECORR	-336
MV/PT	4
DATA MAX	1062.425
DATA MIN	-3145258
ABS MIN	1.000432E-02
ABS MAX	1062.425

LEGEND

CR2D30 HH4371FG IN825 3-9-93
30 DAYS AT 300 C 3.22 CM2 CR DEP
5.11 CM2 600SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2 PPM F
95 ARGON PURGED THIRD SCAN

Daniel De
3/12/93

CR2D30E
CYCLIC POLN



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR2D30E
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

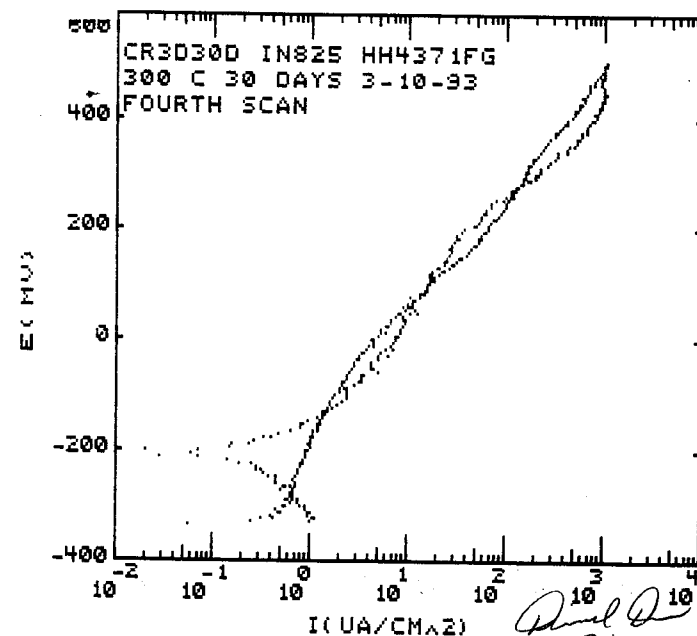
ECORR	-287
MV/PT	4
DATA MAX	1183.673
DATA MIN	-1.039616
ABS MIN	4.201601E-02
ABS MAX	1183.673

LEGEND

CR2D30 HH4371FG IN825 3-9-93
30 DAYS AT 300 C 3.22 CM2 CR DEP
5.11 CM2 600SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2 PPM F
95 C ARGON PURGED FIFTH SCAN

Daniel De
3/12/93

CR2D30D
CYCLIC POLN



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR2D30D
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

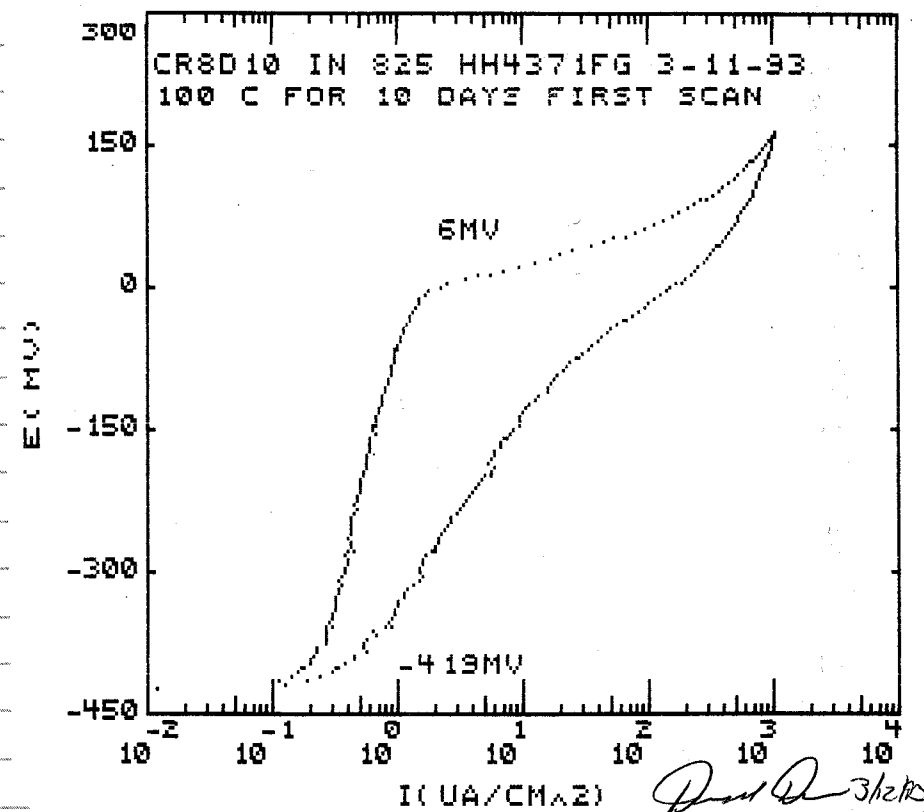
DATA SCALE

ECORR	-333
MV/PT	4
DATA MAX	1090.036
DATA MIN	-1.12485
ABS MIN	2.040016E-02
ABS MAX	1090.036

LEGEND

CR2D30 HH4371FG IN825 3-9-93
30 DAYS AT 300 C 3.22 CM2 CR DEP
5.11 CM2 600SIC
1000 PPM CL
85 PPM HCO3
20 PPM SO4
10 PPM NO3
2 PPM F
95 C ARGON PURGED FOURTH SCAN

Daniel De
3/12/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR8D10
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM ²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS ²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

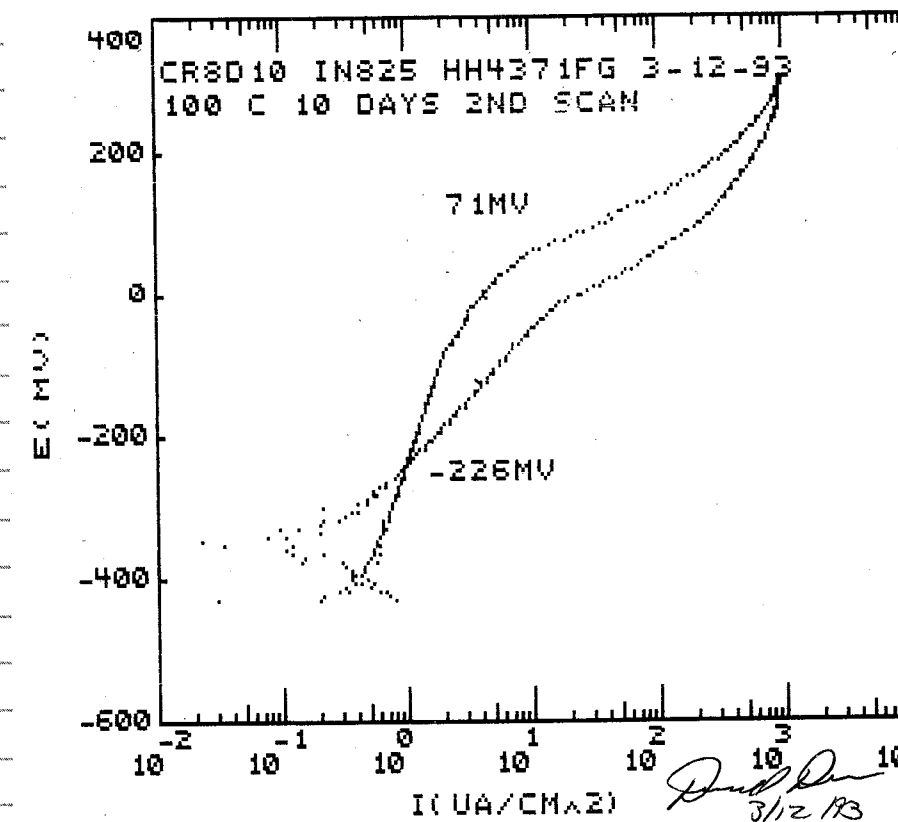
ECORR	-423
MV/PT	4
DATA MAX	1067.227
DATA MIN	.0120048
ABS MIN	.0120048
ABS MAX	1067.227

LEGEND

CR8D10 IN825 HH4371FG 3-11-93
10 DAYS AT 100 C 3.22 CM2 CR DEP
5.11 CM2 600SIC
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED FIRST SCAN

CR8D10B
CYCLIC POLN

Dud D 3/12/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	CR8D10B
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS R
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM ²)	1000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS ²)	8.33
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-430
MV/PT	4
DATA MAX	1002.401
DATA MIN	-.789916
ABS MIN	2.280912E-02
ABS MAX	1002.401

LEGEND

CR8D10 IN825 HH4371FG 3-11-93
10 DAYS AT 100 C 3.22 CM2 CR DEP
5.11 CM2 600SIC
1000 PPM CL
85 PPM HCO₃
20 PPM SO₄
10 PPM NO₃
2 PPM F
95 C ARGON PURGED SECOND SCAN

CR8D10B
CYCLIC POLN

Dud D 3/12/93

176
3/19/93

CYCLIC POLARIZATION

SPECIMEN 316L P80746 600S.C
 $l = 1.913$ $d = 0.249$ AREA = 8.0 cm^2
 SPECIMEN CLEANED IN ULTRASONIC BATH
 RINSED IN DI WATER, ACETONE AND DRIED

SOLUTION 5.2 M NaCl LOT 922649A IN
 DI WATER ADJUSTED TO pH 3.50
 $303.88 \text{ g NaCl} / 1 \text{ ml } 0.02 \text{ g/ml HCl}$
 + DI WATER TO 1000 ml
 $T = 95^\circ \text{C}$ DE AERATED WITH ARGON
 USING TEFCON TUBE.

START PH 2.629

END PH 8.290

POTENTIOSTAT EG&G MODEL 173 SAME AS CP1010D
 P143 DATA SAVER AS 31652M
 USING M342C SOFTWARE

REFERENCE SCE FISHER 13-620-S1 SN 9214083

$E_{\text{CORR}} = -364 \text{ mV}$ KEITNEL 617

$E_{\text{PT}} = +40.7 \text{ mV}$ KEITNEL 617

SCAN ABORTED VERTX TO HIGH (100 VS R)

David D.
 3/19/93

177

3/22/93

CYCLIC POLARIZATION 31652M2

SPECIMEN 316L P80746 600S.C
 $l = 1.915$ $d = 0.250$ WET AREA = 8.0 cm^2
 SPECIMEN CLEANED AS BEFORE P176

SOLUTION 5.2 M NaCl LOT 922649A USING
 DI WATER ADJUSTED TO PH 3.50 ^{OP 7/25/94}
 BY THE ADDITION OF 0.67 ml ~~0.02M HCL~~
 0.02 g/ml HCl TO 1000 ml
 304 g NaCl DISSOLVED IN 700 ml
 OF ACIDIFIED WATER. $\text{HCl}/\text{N}_2\text{O}$
 ADDED TO FINAL VOLUME OF 1000 ml
 AT ROOM TEMP
 $T_{\text{EST TEMP}} = 95^\circ \text{C}$ DE AERATED WITH
 ARGON AS BEFORE

START PH 2.6

END PH 8.1

POTENTIOSTAT EG&G MODEL 173 SAME AS
 CP 1010D P 143 DATA SAVER AS
 31652M2 ^{OP 7/25/94} USING M342C SOFTWARE

REFERENCE SCE FISHER 13-620-S1 SN 9214083

$E_{\text{CORR}} = -198$ KEITNEL 617

$E_{\text{PT}} = -264$ " "

DATA LOST - KEYBOARD LOCKUP

David D.

3/20/93

REST POTENTIAL MEASUREMENTS

SPECIMEN ALLOY 825 NN4371FG MILL FINISH

3.22 cm² MILL FINISH 5.11 cm²

600 S.C. PLACED IN OVEN AT

100 °C FOR 30 DAYS

START WT NOT RECORDED

AFTER 100 °C FOR 30 DAYS NOT RECORDED

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃ 20 PPM SO₄²⁻10 PPM NO₃ 2 PPM F⁻ 2000 ml AS FOLLOWS

3.298 g NaCl LOT 922649A

0.238 g NaHCO₃ LOT 89778940 ml STOCK SOLUTION SO₄-3/9320 ml STOCK SOLUTION NO₃-3/932 ml STOCK SOLUTION F⁻ 3/93

7/25/94 + DI WATER TO 2000 ml T=95 °C

N₂ PURGED

REFERENCE SCE FISHER 13-620-S1 SN 9214083

E_{PT} = -57 mV KEITHLEY 617E_{CORR} = -399 mV

7/25/94

SPECIMEN ALLOY 825 MILL FINISH NN4371FG

3.22 cm² MILL FINISH 5.11 cm² 600 S.C.

PLACED IN OVEN AT 100 °C FOR 1 DAY

START WT

AFTER 100 °C 1 DAY

SOLUTION SAME AS ABOVE

REFERENCE SAME AS ABOVE

E_{CORR} = -455E_{PT} = -49 mV

Paul D
3/20/93

3/22/93

CYCLIC POLARIZATION

SPECIMEN 316 L P80746 600 S.C.

L=1.912 d=0.248 WET AREA=8.0 cm²

SOLUTION 5.2 M NaCl SAME AS 31652M A

176 T=95 °C ARGON PURGED

START PN 2.662

END PN 5.852

POTENTIAL START EG&G 173 SAME AS CP ID10A P148

DATA SAVED AS 31652M2 USING

M342C SOFTWARE

REFERENCE SCE FISHER 13-620-S1 SN 9214083

E_{PT} = -188 mV KEITHLEY 617E_{CORR} = -377 mV

Paul D
3/22/93

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	31652M2
INITIAL E(MV)	-200 VS E
VERTEX E(MV)	20 VS E
FINAL E(MV)	0 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM ²)	5000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

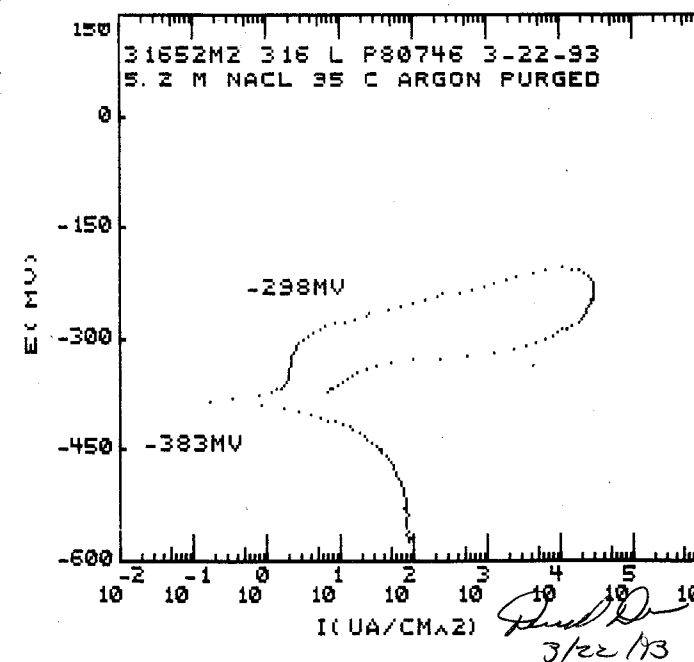
AREA(CMS ²)	8
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

E _{CORR}	-375
MV/PT	4
DATA MAX	30000
DATA MIN	-2560
ABS MIN	.1675
ABS MAX	30000

LEGEND

31652M2 316 L P80746 600 SIC
5.2 M NaCl 95 C ARGON PURGED
3-22-92

31652M2
CYCLIC POLN

Paul D
3/22/93

Paul D
3/22/93

4/9/93

316 LICI CYCLIC POLARIZATION

SPECIMEN

SP 1/25/94

316L P80746 600SIC

ULTRASONICALLY CLEANED AND
RINSED IN DI WATER, ACETONE
AND DRIED. $l = 1.915''$ $d = 0.250''$ WGT AREA $\approx 8.0 \text{ cm}^2$

SOLUTION

10.5 M LICI LOT 926474

MADE WITH ACIDIFIED WATER

0.013 g/l HCl.

445 g LICI ADDED TO 800 ml

ACIDIFIED WATER AND ALLOWED

TO COOL TO ROOM TEMP

TEST TEMP 125°C

ARGON PURGED.

REFERENCE SC6 FISHER 13-620-S1 SN 9214083

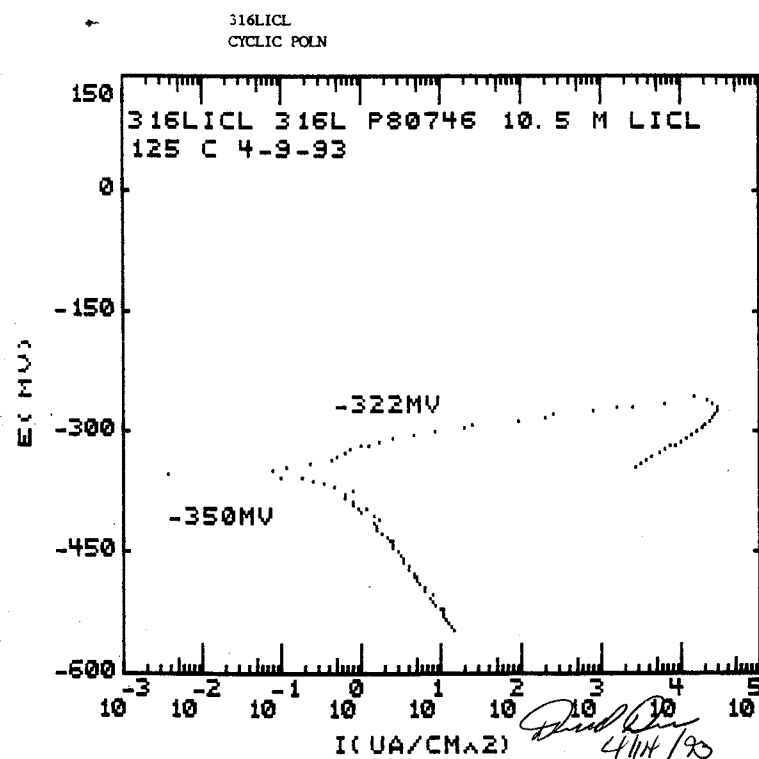
POTENTIOSTAT EG&G M173 SAME AS CP1010 D

P143 DATA SAVED AS 316LICI

USING M342C SOFTWARE.

 $E_{\text{CORR}} -346 \text{ mV}$ KEITHLEY 617 $E_{\text{PT}} +344 \text{ mV}$

4/14/93



RUN PARAMETERS

TECHNIQUE	316LICI
ORIGINAL NAME	316LICI
INITIAL E (mV)	-200 VS E
VERTEX E (mV)	20 VS E
FINAL E (mV)	8 VS E
SCAN RATE (mV/S)	.17
THRESHOLD I (UA/CM ²)	5000
CONDITION E (mV)	PASS
CONDITION T (S)	PASS
INIT DELAY (mV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM ²)	8
EQ WT (GM)	PASS
DENSITY (GM/CM ³)	PASS
CATHODIC TAPEL (mV)	PASS
ANODIC TAPEL (mV)	PASS

DATA SCALE

ECORR	-346
MV/PT	4
DATA MAX	29000
DATA MIN	-2560
ABS MIN	.00375
ABS MAX	29000

LEGEND

316LICI P 80746 600 SIC
445 GRAMS/LITER LICI
4/9/93

4/14/93

4/20/93

316LCL2

CYCLIC POLARIZATION

SPECIMEN

316L P80746 600SIC

ULTRASONICALLY CLEANED AND RINSED
IN DI WATER, ACETONE AND DRIED $l = 1.910''$ $d = 0.247''$ WGT AREA $\approx 8.0 \text{ cm}^2$

SOLUTION

320 g/l LICI LOT 926474

INTO ACIDIFIED WATER 0.013 g/l HCl

320 g LICI ADDED TO 830 ml WATER

TEST TEMP 110°C ARGON PURGED

REFERENCE

FISHER 13-620-S1 SN 9214083

POTENTIOSTAT

EG&G M173 SAME AS CP1010 D P143

DATA SAVED AS 316LCL2 USING

M342C SOFTWARE

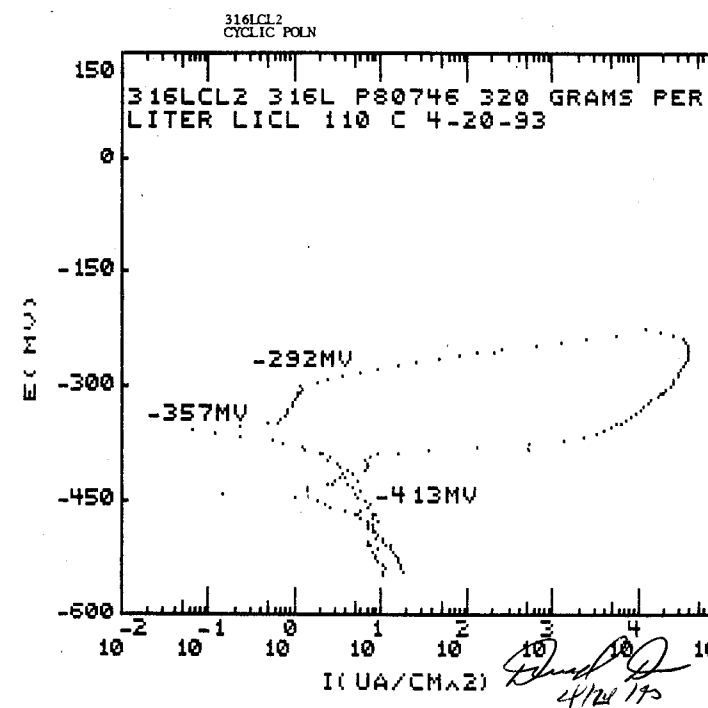
 $E_{\text{CORR}} -346 \text{ mV}$

KEITHLEY 617

 $E_{\text{PT}} +351 \text{ mV}$

START PIN 2.103

END PIN 4.631



RUN PARAMETERS

TECHNIQUE	316LCL2
ORIGINAL NAME	316LCL2
INITIAL E (mV)	-200 VS E
VERTEX E (mV)	20 VS E
FINAL E (mV)	-200 VS E
SCAN RATE (mV/S)	.17
THRESHOLD I (UA/CM ²)	5000
CONDITION E (mV)	PASS
CONDITION T (S)	PASS
INIT DELAY (mV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM ²)	8
EQ WT (GM)	PASS
DENSITY (GM/CM ³)	PASS
CATHODIC TAPEL (mV)	PASS
ANODIC TAPEL (mV)	PASS

DATA SCALE

ECORR	-345
MV/PT	4
DATA MAX	40125
DATA MIN	-256
ABS MIN	.00625
ABS MAX	40125

LEGEND

316LCL2 320 GRAMS/LITER LICI
316 L P80746 600 SIC
320 GRAMS LICI AND 830 ML PH3.5
WATER DEAERATED WITH ARGON
110 DEGREES C 4/20/93

5/3/93

STOCK SOLUTIONS

SO₄ - 5/931000 PPM SO₄²⁻ AS Na₂SO₄1.48505 g Na₂SO₄ LOT 901213 + DI
WATER TO 1000 ml EXP 6/2/93NO₃ - 5/931000 PPM NO₃⁻ AS NaNO₃1.37662 g NaNO₃ LOT 897183 + DI
WATER TO 1000 ml EXP 6/2/93

F - 5/93

1000 PPM F⁻ AS NaF2.21413 g NaF LOT 896405 + DI
WATER TO 1000 ml EXP 6/2/93

Dunn 5/3/93

5/3/93

304L CV

CYCLIC POLARIZATION

SPECIMEN 304L P/O # 88268 600 S.C HT# T0954

L = 1.907 d = 0.251 WET AREA = 10.0 cm²

SPECIMEN CLEANED IN ULTRASONIC BATH

RINSED IN DI WATER, ACETONE AND DRIED

START WT. 11.22340g

END WT. 11.17546g

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃⁻ 20 PPM SO₄²⁻10 PPM NO₃⁻ 2 PPM F⁻ 2000 ml AS FOLLOWS

3.299 g NaCl LOT 922649A

0.237 g NaNO₃ LOT 89778940 ml SO₄ - 4/93 STOCK SOLUTION20 ml NO₃ - 4/93 "

4 ml F - 4/93 "

+ DI WATER TO 1000 ml STOCK SOLUTIONS

P182 T = 19°C ARGON PURGED

POTENTIostat EG&G MODEL 173 SAME AS CP1010D

P143 DATA SAVED AS 304LCV USING M342C

SOFTWARE.

REFERENCE. SCG FISHER 13-620-SI SW 9214083

ECORR - 310 mV KETINLOY 617

EPT + 55 mV " "

START PN = 8.050

END PN = 8.861

PLOT AND RUN PARAMETERS P 184

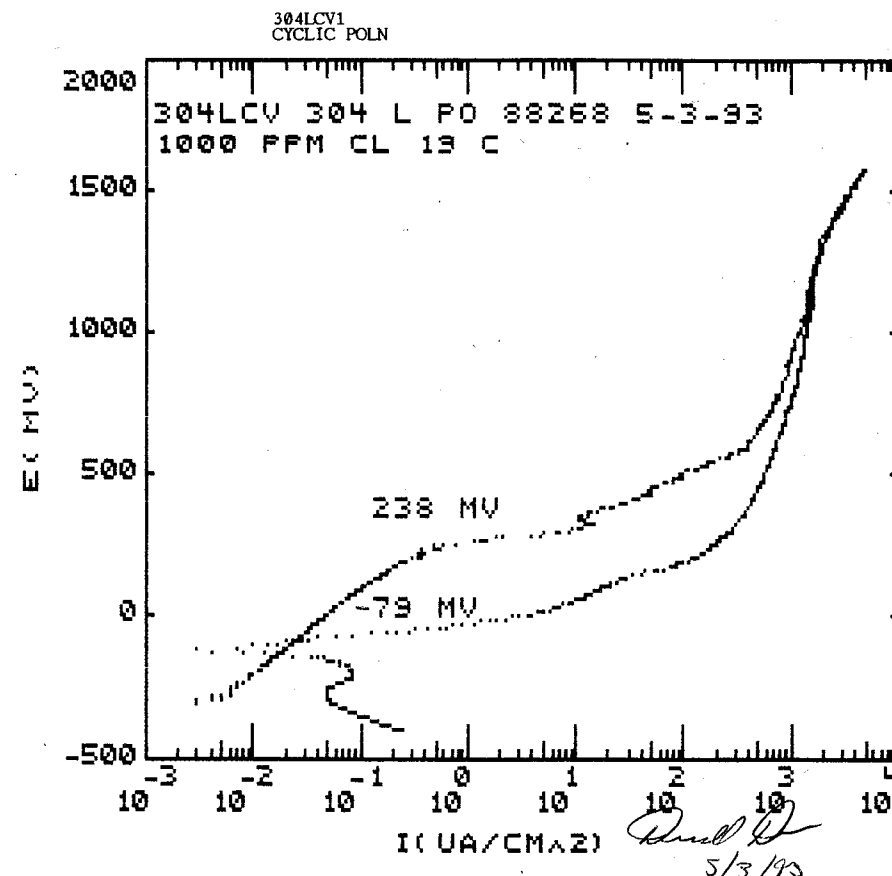
Dunn 5/5/93

DDUNN

Stored in Cyclic Polarization #1 diskette

5/13/93

5/3/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	304LCV1
INITIAL E(MV)	0 VS E
VERTEX E(MV)	50 VS E
FINAL E(MV)	-100 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM^2)	5000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS^2)	10
EQ WT(GM)	PASS
DENSITY(GM/CM^3)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

ECORR	-387
MV/PT	4
DATA MAX	5220
DATA MIN	-2.048
ABS MIN	0
ABS MAX	5220

LEGEND

304LCV 304L P/0 # 88268 600 SIC
1000 PPM CL 85 PPM HCO3 10 PPM NO3
20 PPM SO4 2 PPM F
22 C 5/2/93

5/3/93

316 LCL 3

CYCLIC POLARIZATION

SPECIMEN 316L P80746 600 SIC

CLEANED IN ULTRASONIC BATH

RINSED IN DI WATER AND ACETONE
AND DRIED $\ell = 1.914''$ $d = 0.247''$ WGT AREA = 8.0 cm^2

START WT = 11.59773g

END WT =

SOLUTION 5.2 MOLES LICI LOT 926474

DISSOLVED IN DI WATER ADJUSTED

TO PH 4 BY THE ADDITION OF

0.0021g/L HCl 830 ml WATER

SOLUTION DEAERATED WITH ARGON

T = 95°C N₂ THERMO 0323006 CAL DUC

2 FEB 94

POTENTIOSTAT EG&G M173 SAME AS CP1010A

P143 DATA SAVED AS 316LCL3 USING

M342C SOFTWARE. 7/25/94

REFERENCE FISHER ~~13-66~~ 13-620-SI SN 9214083

ECORR -561 mV

E_{PT} -32 mV

CONDITION E -1174 mV FOR 10 MIN

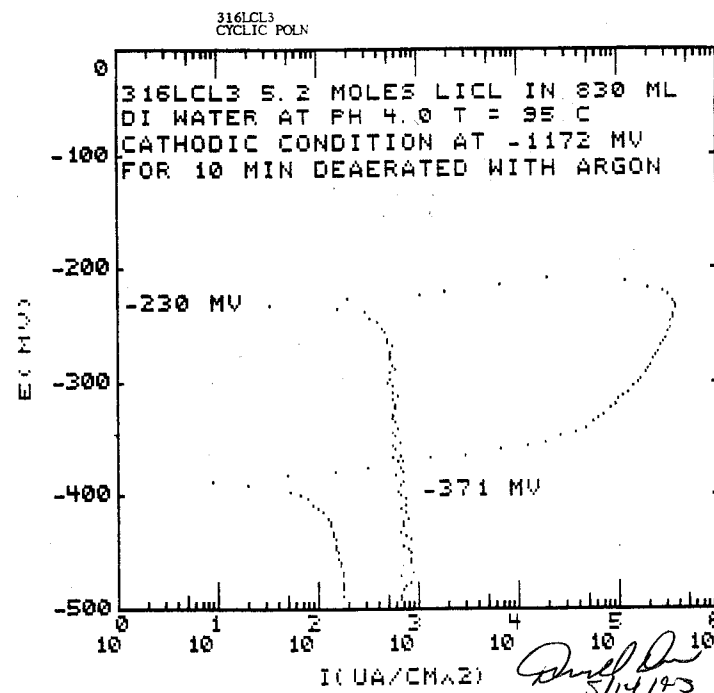
START PH 2.974

END PH 7.803

Dunn D 5/14/93

Stored in DDUNN #1

9/13/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	316LCL3
INITIAL E(MV)	-200 VS E
VERTEX E(MV)	20 VS E
FINAL E(MV)	-200 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(uA/cm²)	5000
CONDITION E(MV)	-1172
CONDITION T(S)	600
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS²)	1
EQ WT(GM)	PASS
DENSITY(GM/CM³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-291
MV/PT	4
DATA MAX	369000
DATA MIN	-20480
ABS MIN	9
ABS MAX	369000

5/14/93

5/13/93 316NCL1 CYCLIC POLARIZATION

SPECIMEN 316L P8074L 60051C CLEANED

IN ULTRASONIC BATH RINSED IN

DI WATER, ACETONE AND DRIED

 $R = 1.916$ $d = 0.246$ WET AREA = 8.0 cm^2

START WT 11.28806 g

END WT

SOLUTION 5.2 MOLES NaCl LOT 922649A

DISSOLVED IN 830 ml DI WATER

ADJUSTED TO PH 4.0 BY THE ADDITION OF 0.0021 g/l HCl

SOLUTION DEAERATED WITH ARGON USING

TGFLOW TUBE T=95°C N_2 THERMO 0323006

POTENTIOSTAT EG&G M173 SAME AS CP1010 D

P143 DATA SAVED AS 316NCL1

USING M342C SOFTWARE

REFERENCE SCE FISHER 13-620-51 SN 9214083

 $E_{\text{CORR}} = -383 \text{ mV}$ $E_{\text{PT}} = +371 \text{ mV}$ $E_{\text{CONDITION}}$

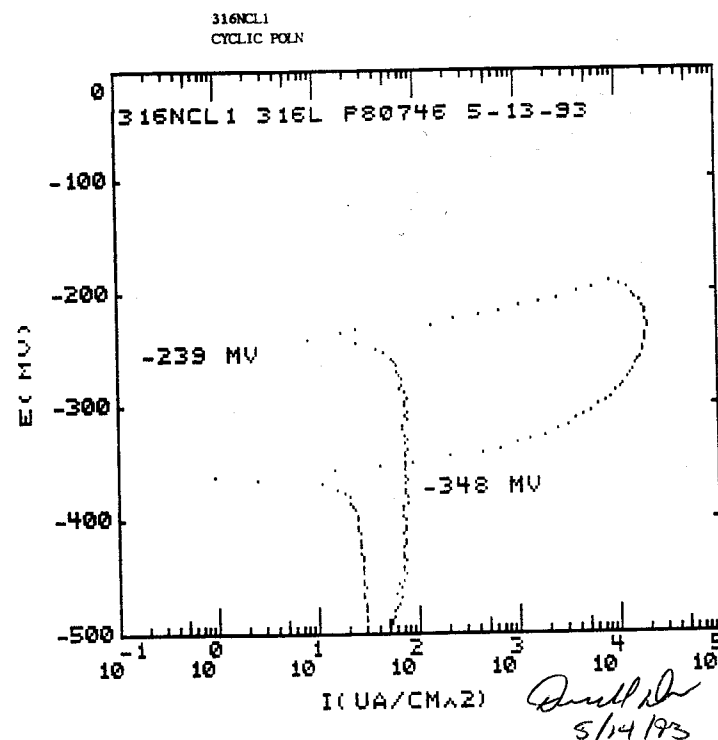
START PH 3.431

END PH 5.802

5/14/93

Stored in DDUNN #1

9/12/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	316NCL1
INITIAL E(MV)	-200 VS E
VERTEX E(MV)	20 VS E
FINAL E(MV)	-200 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM²)	5000
CONDITION E(MV)	-1172
CONDITION T(S)	600
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS²)	8
EQ WT(GM)	PASS
DENSITY(GM/CM³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

ECORR	-292
MV/PT	4
DATA MAX	19487.5
DATA MIN	-79.875
ABS MIN	.9625
ABS MAX	19487.5

LEGEND

316NCL1 316L P80746 600 SIC
5.2 MOLES NaCl IN 830 ML DI WATER
ADJUSTED TO PH 4. T = 95 C
5-13-93

D. J. R.
5/14/93

5/14/93

316LCL4

SPECIMEN 316L P80746 600SIC CLEANED
IN ULTRASONIC BATH RINSED IN ACETONE
DI WATER $\rho = 1.915$ $d = 0.250$
WET AREA = 8.0 cm^2
START WT = 11.59773 g
END WT = NOT RECORDED
SOLUTION 5.2 moles LiCl LOT 926474
DISSOLVED IN 830 ml DI WATER ADJUSTED
TO PH 4.0 BY THE ADDITION OF 0.0021 g/l
HCl SOLUTION PREPARED WITH ARGON
T = 95°C N₂ THERMO 0323006
POTENTIOSTAT EG&G M173 SAME AS CP 1010 D
P 143 DATA SAVED AS 316LCL4 USING
M 342C SOFTWARE.

REFERENCE SCE FISHER 13-620-SI SN 9214083

ECORR -590 mV KEITNLEY 617

EPT +24 mV

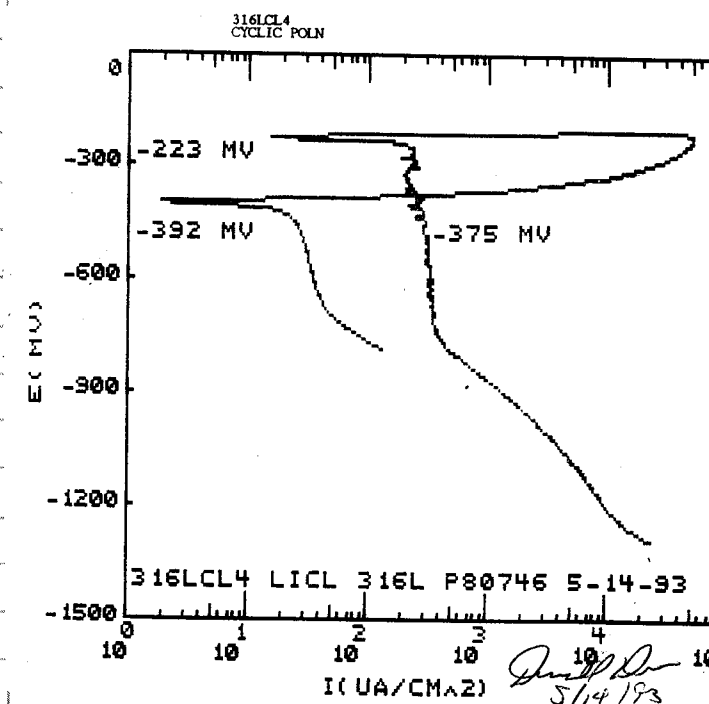
START PH 2.221

END PH 3.082

stored in 2DYN#1

5/14/93
3 B

D. J. R. 5/14/93



RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	316LCL4
INITIAL E(MV)	-700 VS E
VERTEX E(MV)	20 VS E
FINAL E(MV)	-200 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM²)	5000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	10 S

SAMPLE PARAMETERS

AREA(CMS²)	8
EQ WT(GM)	PASS
DENSITY(GM/CM³)	PASS
CATHODIC TAPEL(MV)	PASS
ANODIC TAPEL(MV)	PASS

DATA SCALE

ECORR	-588
MV/PT	4
DATA MAX	51750
DATA MIN	-24125
ABS MIN	1.875
ABS MAX	51750

LEGEND

316LCL4 316L P80746 5-14-93

D. J. R.
5/14/93

6/2/93

G 61

SPECIMEN 304L HT#T0954 600S: C
 CLEANED IN ULTRASONIC BATH 5 MINUTES RINSED
 IN D.I. WATER $l = 1.910$ in $d = 0.245$ in
 WET AREA = 10 cm^2
 Solution ~~3.56%~~ by weight NaCl lot 922649A
 3.56% weight percent, 34g dissolved in
 920 ml D.I. water.
 $T = 25^\circ\text{C}$ Hg THERMOMETER 0323008
 Calibrated 2 Feb 93 due 2 Feb 94

Potentiostat EG & G M173 Calibrated 19 May 93 due 19 May 94
 Data SAVED AS G61 using M342C SOFTWARE.
 Reference SCE Fisher 13-620-51 SN 9214083

$E_{\text{CORR}} -128 \text{ mV}$
 $E_{\text{PT}} 370 \text{ mV}$
 Start pH 5.970
 End pH 9.312

stored in KUCHAR #1

9/3/93

6/2/93

Paul E. Kuhf

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E(MV)
 VERTEX E(MV)
 FINAL E(MV)
 SCAN RATE(MV/S)
 THRESHOLD I(UA/CM²)
 CONDITION E(MV)
 CONDITION T(S)
 INIT DELAY(MV/S OR S)

CYCLIC POLN
 G61
 0 VS E
 100 VS E
 0 VS E
 .17
 5000
 PASS
 PASS
 60 S

SAMPLE PARAMETERS

AREA(CMS²)
 EQ WT(GM)
 DENSITY(GM/CM³)
 CATHODIC TAPEL(MV)
 ANODIC TAPEL(MV)

10
 PASS
 PASS
 PASS
 PASS

DATA SCALE

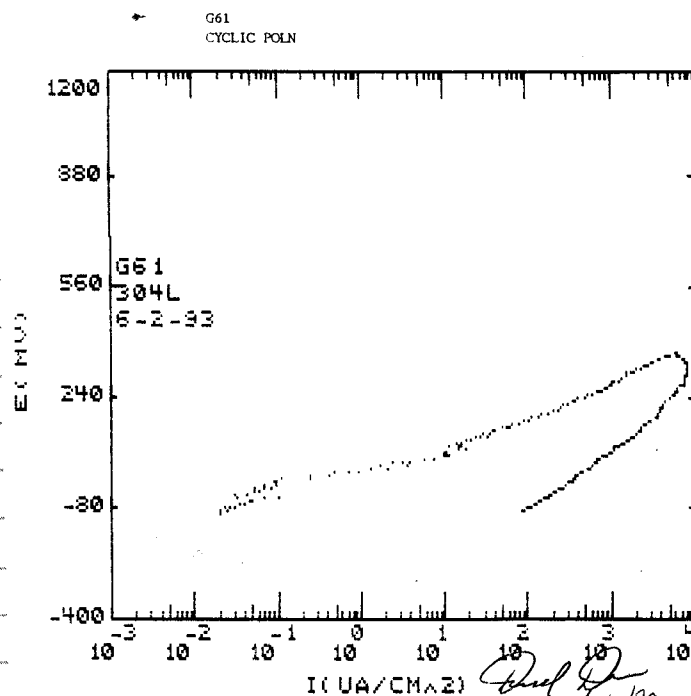
E_{CORR}
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-94
 4
 8400
 .02
 .02
 -400

LEGEND

ASTM G 61
 304L 600SIC HT#T0954
 NaCl 3.56% BY WEIGHT
 6/2/93

Paul E. Kuhf
 6/14/93



6/3/93

G 61 B

SPECIMEN 304L HT#T0954 600S: C
 CLEANED IN ULTRASONIC BATH IN DEGREASING DETERGENT
 FOR 5 MINUTES. RINSED IN D.I. WATER
 $l = 1.913$ in $d = 0.246$ in
 WET AREA = 10 cm^2
 Solution 3.56% by weight NaCl lot 922649A
 34g NaCl dissolved in 920 ml D.I. water, deaerated
 for 1 hour with Argon.
 $T = 25^\circ\text{C}$ Hg THERMOMETER SAME AS G61 p190
 0323008

Potentiostat EG & G M173 SAME AS G61 p190. Data
 SAVED AS G61 B using M342C SOFTWARE.
 Reference SCE Fisher 13-620-51 SN 0165403

$E_{\text{CORR}} -464 \text{ mV}$
 $E_{\text{PT}} 450 \text{ mV}$
 Start pH 5.926
 End pH 6.112

stored in
 KUCHAR #1

6/3/93 9/3/93

Paul E. Kuhf

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E(MV)
 VERTEX E(MV)
 FINAL E(MV)
 SCAN RATE(MV/S)
 THRESHOLD I(UA/CM²)
 CONDITION E(MV)
 CONDITION T(S)
 INIT DELAY(MV/S OR S)

CYCLIC POLN
 G61 B
 0 VS E
 100 VS E
 -50 VS E
 .17
 5000
 PASS
 PASS
 60 S

SAMPLE PARAMETERS

AREA(CMS²)
 EQ WT(GM)
 DENSITY(GM/CM³)
 CATHODIC TAPEL(MV)
 ANODIC TAPEL(MV)

10
 PASS
 PASS
 PASS
 PASS

DATA SCALE

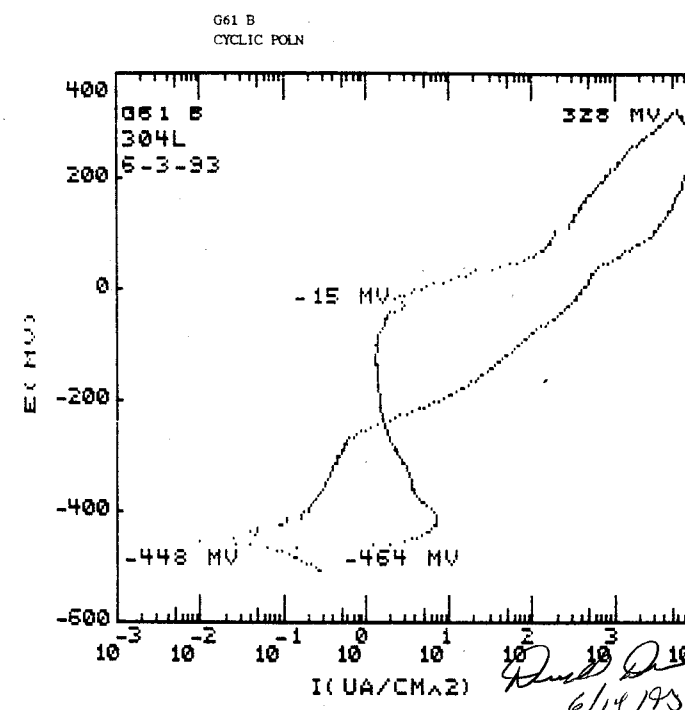
E_{CORR}
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-462
 4
 8280
 -.29
 .009
 8280

LEGEND

ASTM G 61
 304L 600SIC HT#T0954
 NaCl 3.56% BY WEIGHT
 6/3/93

Paul E. Kuhf
 6/14/93



6/8/93

C22CPI Cyclic Polarization of C22 test #1

SPECIMEN C22 HT# 2277-8-3175 600 SiC

CLEANED IN DETERGENT IN ULTRASONIC BATH FOR 5 MINUTES. RINSED IN D.I. WATER.

 $R = 1.917$ in $d = 0.248$ in WET AREA = 10 cm^2 SOLUTION 10,000 ppm Cl^- 85 ppm HCO_3^- 20 ppm SO_4^{2-} 10 ppm NO_3^- 2 ppm F^-

1000 ml of solution

16.48g NaCl Lot # 9226498 ~~PK~~ 922649A.118g NaHCO_3 Lot # 89778920 ml SO_4^{2-} stock solution 6/93 SEE PAGE 19310 ml NO_3^- stock solution 6/93 SEE PAGE 1932 ml F^- stock solution 6/93 SEE PAGE 193

Stock solutions page 193

DEAERATED IN CO_2 FOR 1 HOUR. AFTER 1 HOURDEAERATION COMPLETE SAMPLE IMMERSED IN SOLUTION FOR 1 HOUR ~~CONTINUE~~ ~~PK~~ WHITE ~~PK~~ WITH NO POTENTIAL ON THE SAMPLE. CONTINUE TO DEAERATE WITH CO_2 $T = 95^\circ\text{C}$ Hg THERMOMETER 0323006

CALIBRATED 2 FEB 93 NEXT DUE 2 FEB 94.

POTENTIAL STAT EG & ~~PK~~ G M173 SAME AS G61 p190

DATA SAVED AS C22CPI USING M342C SOFTWARE.

REFERENCE SCE FISHER ~~PK~~ 13-620-51 SN 0165403E_{corr} -526 mVE_{pk} 205 mV

Start pH 8.131

End pH

Test interrupted due to power surge. Data lost.

6/8/93

John E. Kuchar

Stored in Kuchar #1

N

9/3/93

Stock Solutions

6/8/93

See p. 260 of Lab Notebook IWPE-025

N. Smith
6/8/93

6/9/93

C22CP2 Cyclic Polarization of C22 test #2

SPECIMEN C22 HT# 2277-8-3175 600S.C

CLEANED in ultrasonic bath for 5 minutes with degreasing detergent. Rinsed off with D.I. H₂O $\ell = 1.917$ $d = 0.248$ WET AREA 10 cm²Solution 10,000 ppm Cl⁻ 85 ppm HCO₃⁻ 20 ppm SO₄²⁻10 ppm NO₃⁻ 2 ppm F⁻ 1000 ml of solution

16.48 g of NaCl lot# 922649A

.118 g of NaHCO₃ lot# 89778920 ml of SO₄²⁻ stock solution 6/93 SEE PAGE 19310 ml of NO₃⁻ stock solution 6/93 SEE PAGE 1932 ml of F⁻ stock solution 6/93 SEE PAGE 193

stock solutions SEE PAGE 193

DEAERATED in CO₂ for 1 hour at room temperature.REMOVE sample to measure pH. Increased temperature to 95°C while deaerating with CO₂. Insert sample. Continue to deaerate. After 1 hour conduct cyclic polarization.

T = 95°C Hg Thermometer 0323006 SAME AS 6/8/93 p192

Potentiostat EG&G M173 SAME AS 6/6/93 p190. Data saved

AS C22CP2 using M342C software

REFERENCE SCE Fisher 13-620-51 SN 0165 403

E_{corr} -542.6 mV -478 mVE_{pt} -40.8 mV

pH start 4.795

pH end 5.480

PARAMETERS AND plot on PAGE 195

6/9/93 Frank E. Kuehler

SPECIMEN APPEARANCE is that it has a bronze colored oxide layer and there are no pits.

stored in KUEHLER #1

9/3/93

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	C22CP2
INITIAL E (MV)	0 VS E
VERTEX E (MV)	100 VS E
FINAL E (MV)	-50 VS E
SCAN RATE (MV/S)	.17
THRESHOLD I (UA/CM ²)	5000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	60 S

SAMPLE PARAMETERS

AREA (CM ²)	10
EQ WT (GM)	PASS
DENSITY (GM/CM ³)	PASS
CATHODIC TAFEL (MV)	PASS
ANODIC TAFEL (MV)	PASS

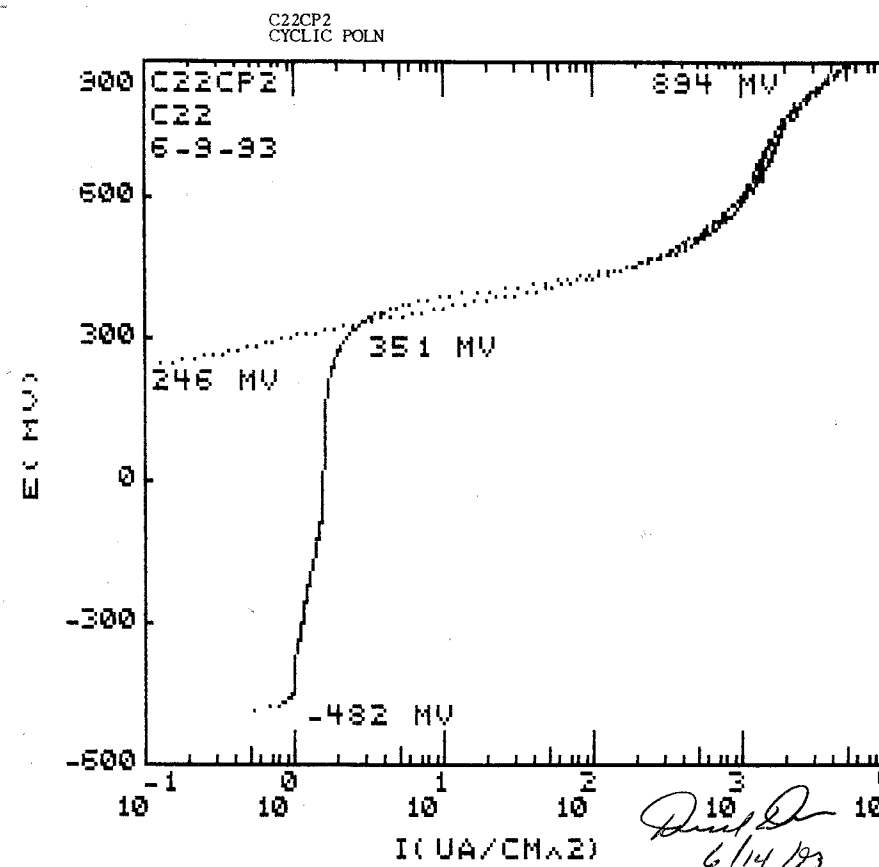
DATA SCALE

ECORR	-480
MV/PT	4
DATA MAX	5600
DATA MIN	.1
ABS MIN	.1
ABS MAX	5600

LEGEND

C22CP2 TEST #2
C22 600 SIC
SOLUTION: 10000PPM CL 85PPM HCO3
20PPM SO4 10PPM NO3 2PPM F
6/9/93

6/14/93



6/10/93

C22CP3 Cyclic polarization of C22 test #3

SPECIMEN C22 HT# 2277-8-3175 600SIC finish
 Cleaned in ultrasonic bath with detergent for
 5 minutes. ~~Rinsed~~ Rinsed off with D.I. water.

$l = 1.917$ in $d = 0.248$ wet area = 10 cm^2

Solution 10000 ppm Cl^- , 85 ppm HCO_3^- , 20 ppm SO_4^{2-} , 10 ppm NO_3^- , 2 ppm F-
 1000 ml of solution.

16.48 g NaCl Lot # 922649A, .118 g NaHCO_3 Lot # 897789
 20 ml SO_4^{2-} stock solution 4/93, 10 ml NO_3^- stock solution 4/93
 2 ml F- stock solution 4/93. Stock solutions see page 193
 Adjusted to pH 3.092 by adding 2 ml .02 g/ml
 HCl solution.

Deaerated with Argon for 1 hour. Specimen
 immersed for 1 hour with continued deaeration.
 $T = 95^\circ\text{C}$ Hg thermometer 0323006 SAME AS
 C22CP1 page 192.

Potentiostat EG and G M173 SAME AS G61 page 190.

Data saved as C22CP3 using M342C software.

Reference SCE Fisher 13-620-51 SN 0165403

$E_{\text{corr}} = -234.2 \text{ mV}$ - 187.85 mV

$E_p = 223.9 \text{ mV}$

• pH start 3.092

pH end 3.254

weight start = 12.27861 g

weight end = 12.27090 g

End appearance of the specimen is that there is a
 gold to red film on the specimen and there are no pits.

6/10/93 *John E. Kuhl*

Parameters and plot on page 197

Stored in KUCHAR#1

9/3/93

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E(MV)
 VERTEX E(MV)
 FINAL E(MV)
 SCAN RATE(MV/S)
 THRESHOLD I(UA/CM²)
 CONDITION E(MV)
 CONDITION T(S)
 INIT DELAY(MV/S OR S)

CYCLIC POLN
 C22CP3
 0 VS E
 100 VS E
 -50 VS E
 .17
 5000
 PASS
 PASS
 60 S

SAMPLE PARAMETERS

AREA(CMS²)
 EQ WT(GM)
 DENSITY(GM/CM³)
 CATHODIC TAPEL(MV)
 ANODIC TAPEL(MV)

10
 PASS
 PASS
 PASS
 PASS

DATA SCALE

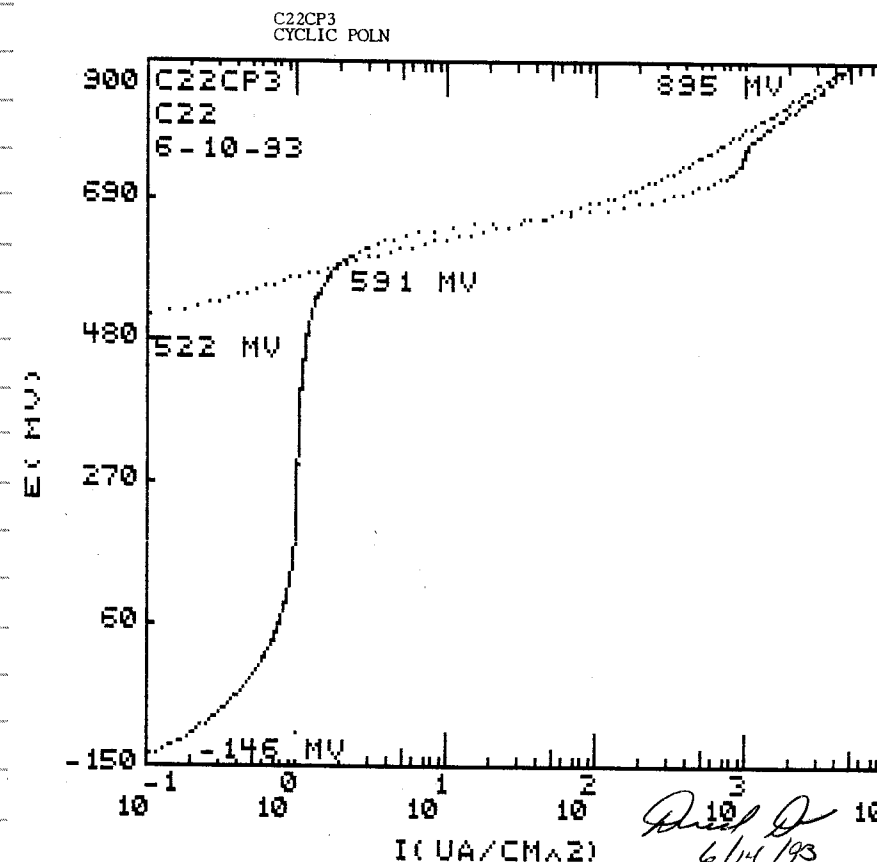
ECORR
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-144
 4
 5630
 .005
 .005
 5630

LEGEND

C22CP3 TEST #3
 C22 600 SIC
 SOLUTION: 10000PPM CL 85PPM HCO3
 20PPM SO4 10PPM NO3 2PPM F
 ADJUSTED TO PH 3.092 BY ADDING
 2ML .02G/ML HCL SOLUTION
 3/10/93

John E. Kuhl
 6/14/93



6/11/93

C22CP4 Cyclic polarization of C22 Test #4

SPECIMEN C22 HT #2277-8-3175 600SIC. CLEANED IN
ULTRASONIC BATH in detergent for 5 minutes. RINSED
OF IN D.I WATER.

Solution $l = 1.916$ in $d = 0.248$ in wet AREA = 10 cm^2
10000ppm Cl^- , 85ppm HCO_3^- , 20ppm SO_4^{2-} , 10ppm NO_3^-
2ppm F^-
16.48g NaCl Lot #922649A, .118g NaHCO_3 Lot #897789
20ml stock solution SO_4^{2-} stock solution 6/93
10ml NO_3^- stock solution 6/93
2ml F^- stock solution 6/93

stock solutions SEE PAGE 193

Adjusted to pH 1.04 by adding 8.78 ml H₂SO₄
36.5% HCl Lot #920004

DEAERATED for 1 hour. SAMPLE IMMersed 1 hour
with continued deaeration.

T = 95°C Hg Thermometer 0323006 SAME AS
C22CP1 PAGE 192.

Potentiostat EG&G M173 SAME AS G61 PAGE 190. Data
SAVED AS C22CP4 USING M342C SOFTWARE.

Reference SCE Fisher 13-620-51 ~~SN 2134032~~ SN 2134032

E_{corr} = -207 mV

E_{pt} = 5372 mV

pH start = 1.04

pH end = 1.038

END APPEARANCE: NO discoloration or pits

PARAMETERS and plot on page 199

Jah E. Khah Jr. 6/11/93

Stored in KUCHAR #1

9/3/93

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	C22CP4
INITIAL E(MV)	0 VS E
VERTEX E(MV)	50 VS E
FINAL E(MV)	-100 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM ²)	5000
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	60 S

SAMPLE PARAMETERS

AREA(CMS ²)	10
EQ WT(GM)	PASS
DENSITY(GM/CM ³)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

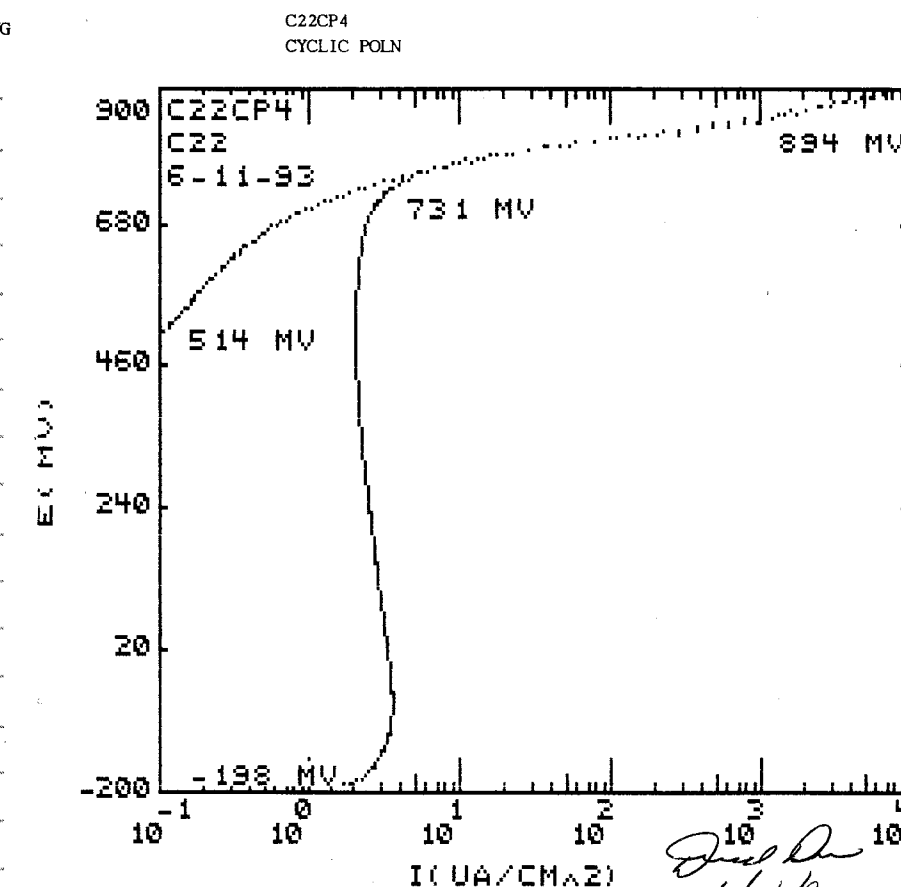
DATA SCALE

ECORR	-206
MV/PT	4
DATA MAX	6930
DATA MIN	-2048
ABS MIN	.09
ABS MAX	6930

LEGEND

C22CP4
C22 600 SIC
SOLUTION: 10000PPM CL 85PPM HCO₃
20PPM SO₄ 10PPM NO₃ 2PPM F
ADJUSTED TO PH 1.04 BY ADDING
8.78ML 36.5% HCL

Dr. Khah
6/14/93



6/14/93

C22CP5 Cyclic polarization Test #5

SPECIMEN C22 HT# 2277-8-3175 600 SiC finish.
 Cleaned in ultrasonic bath with detergent
 for 5 minutes. Rinsed with D.I. water

$l = 1.917$ in $d = 0.2475$ wet area = 10 cm^2

Solution 10,000 ppm Cl^- , 20 ppm SO_4^{2-} , 10 ppm NO_3^- , 2 ppm F^-

1096 400 ml of solution.

17.96 g NaCl lot# 926368A

20 ml SO_4^{2-} stock solution 6/93

10 ml NO_3^- stock solution 6/93

2 ml F^- stock solution 6/93

Adjusted Stock solutions SEE PAGE 193

Adjusted to pH -0.027 by adding 96 ml

36.5% HCl lot# 92004

Deaerated for 1 hour. Sample immersed for
 1 hour after initial deaeration period. Deaeration
 continued.

$T = 95^\circ \text{C}$ Hg Thermometer 0323006 et al SAME AS
 C22CP1 PAGE 192.

Potentiostat EG&G M173 SAME AS G61 PAGE 190. Data saved
 AS C22CP5 using M842C software.

Reference SCE Fisher 13-620-51 SV 3106337

E_{corr} - 0.218

E_{pl} 0.010

pH start - 0.027

pH end - 0.020

End appearance - NO pits and NO discoloration

beginning weight. 12.13646 g

END weight 12.12748 g

Parameters and plot on page 201

John G. Kufel

6/14/93

stored in KUCAR#1

NS 9/13/93.

RUN PARAMETERS

TECHNIQUE
 ORIGINAL NAME
 INITIAL E(MV)
 VERTEX E(MV)
 FINAL E(MV)
 SCAN RATE(MV/S)
 THRESHOLD I(UA/CM²)
 CONDITION E(MV)
 CONDITION T(S)
 INIT DELAY(MV/S OR S)

CYCLIC POLN
 C22CP5
 0 VS E
 100 VS E
 -100 VS E
 .17
 5000
 PASS
 PASS
 60 S

SAMPLE PARAMETERS

AREA(CMS²)
 EQ WT(GM)
 DENSITY(GM/CM³)
 CATHODIC TAFEL(MV)
 ANODIC TAFEL(MV)

10
 PASS
 PASS
 PASS
 PASS

DATA SCALE

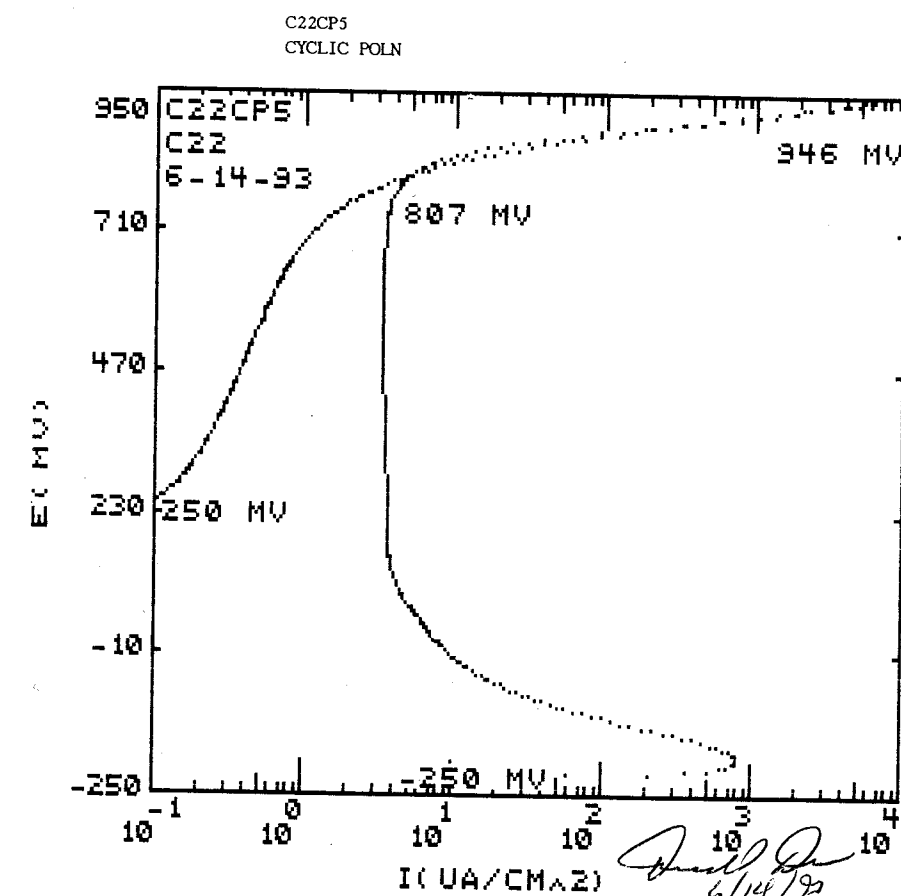
ECORR
 MV/PT
 DATA MAX
 DATA MIN
 ABS MIN
 ABS MAX

-218
 4
 7760
 -2048
 .097
 7760

LEGEND

C22CP5
 C22 600SiC
 SOLUTION: 10000PPM CL 20PPM SO4
 10PPM NO3 2PPM F
 ADJUSTED TO PH -0.027 BY ADDING
 96ML 36.5% HCL
 6/14/93

6/14/93



9/13/93

825CRV2

1000 ppm Cl^- ~~0.5 M NaCl~~

ROOM Temp

7/25/94

SPECIMEN ALLOY 825 HH4371FG 600 S.C

CLEANED IN ULTRASONIC BATH WITH

DETERGENT RINSED IN DI WATER, ACETONE

AND DRIED $\ell = 0.750"$ $d = 0.248"$

START WT = 4.46842 g

END WT = 4.45574 g

AREA = 4.39 cm^2 FULLY IMMERSSEDSOLUTION 1000 PPM Cl^- 85 PPM NaCO_3 20 PPM SO_4^{2-} 10 PPM NO_3^- 2 PPM F- 1000 ml AS FOLLOWS

1.64894 g NaCl LOT 926368A

0.11926 g NaHCO_3 LOT 89778920 ml SO_4 - 9/93 STOCK SOLUTION10 ml NO_3 - 9/93

2 ml F - 9/93

+ DI WATER TO 1000 ml STOCK SOLUTIONS

P 33 IWPE 085

START PN = 8.136

END PN = 7.357

REFERENCE SCC FISHER 13-620-51 SN 0165403

POTENTIOSTAT EG&G 173 CAL DUE MAY 94

ID # 62101 DATA SAVED AS

825CRV2 USING M342C SOFTWARE

 $E_{\text{CORR}} = -104 \text{ mV}$ $E_{\text{PT}} = +313 \text{ mV}$

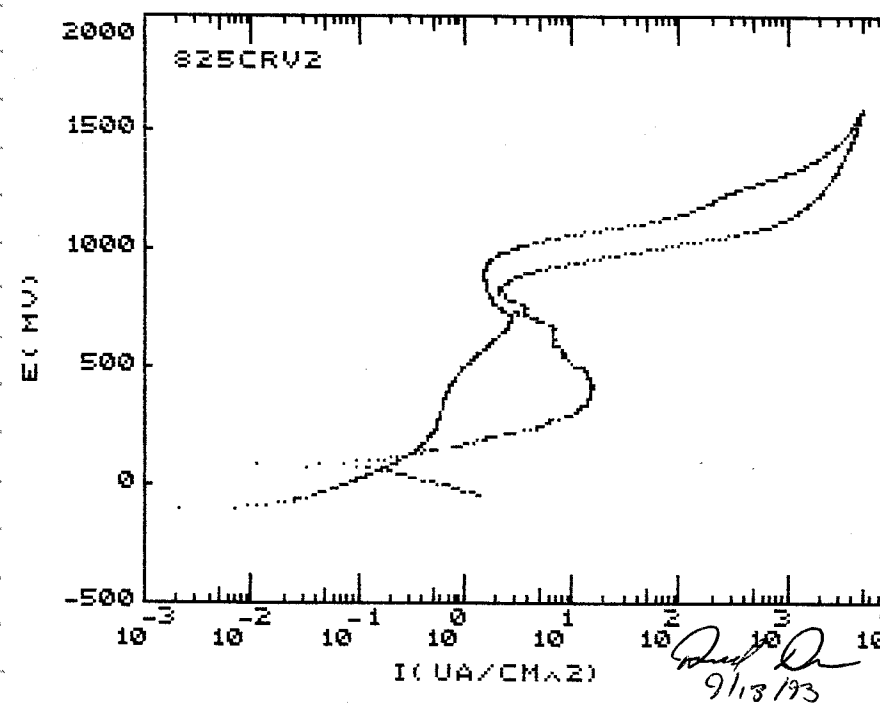
PLOT AND RUN PARAMETERS P203

7/25/94

PITS PRESENT ON SURFACE OF SPECIMEN

SUMM CR6166 CORROSION IN GASKETED REGION

9/13/93

825CRV2
CYCLIC POLN

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	825CRV2
INITIAL E(MV)	0 VS E
VERTEX E(MV)	100 VS E
FINAL E(MV)	50 VS E
SCAN RATE(MV/S)	.17
THRESHOLD I(UA/CM^2)	5000.
CONDITION E(MV)	PASS
CONDITION T(S)	PASS
INIT DELAY(MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA(CMS^2)	4.39
EQ WT(GM)	PASS
DENSITY(GM/CM^3)	PASS
CATHODIC TAFEL(MV)	PASS
ANODIC TAFEL(MV)	PASS

DATA SCALE

ECORR	-98
MV/PT	4
DATA MAX	5079.727
DATA MIN	-4.665148
ABS MIN	2.050114E-03
ABS MAX	5079.727

LEGEND

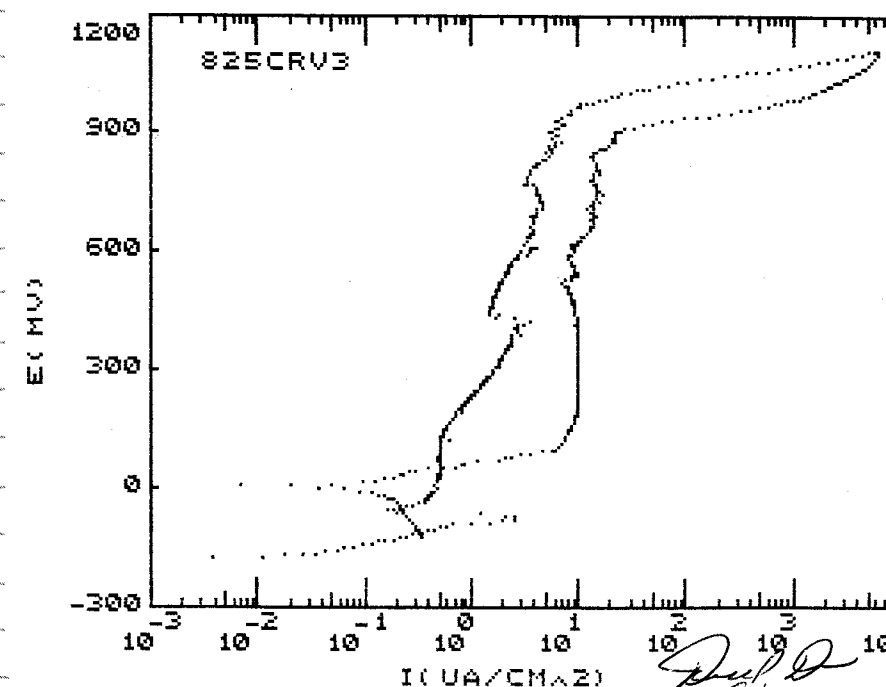
825CRV2 ALLOY 825 HH4371FG
600 SIC FULLY IMMERSSED IN
0.5 M NaCl 85 PPM HCO_3 20 PPM SO_4
10 PPM NO_3 2 PPM F
9/9/93

9/13/93

825CRV3

SPECIMEN ALLOY 825 HH4371FG 600SIC
PRE PARGN SAME AS 825CRV2 P202
 $\lambda = 0.750$ $d = 0.248$
START WT 4.43755g
END WT NOT RECORDED
AREA 4.39cm²
SOLUTION 0.5 MCL 85PPM NaCl 20PPM SO₄²⁻
10PPM NO₃⁻ 2PPM F⁻ 1000 ml AS FOLLOWS
29.22182 g NaCl LOT 926368A
0.11940 g NaNO₃ LOT 897789
20ml SO₄ - 9/93 STOCK SOLUTION
10ml NO₃ - 9/93 "
2ml F⁻ - 9/93 "
+ DI WATER TO 1000 ml STOCK SOLUTIONS
P 33 IWPE 085
START PA 8.004
END PA NOT RECORDED
REFERENCE SCE FISHER 13-620-SI SN 0165403
POTENTIOSTAT EG&G 173 SAME AS 825CRV2 P202
DATA SAVER AS 825CRV3 USING M342C
SOFTWARE 7/25/94
E_{CORR} +177 -178mV KETACOT 614
E_{PR} +215

Dr. D
9/10/93

825CRV3
CYCLIC POLN

RUN PARAMETERS

TECHNIQUE	CYCLIC POLN
ORIGINAL NAME	825CRV3
INITIAL E (MV)	0 VS E
VERTEX E (MV)	100 VS E
FINAL E (MV)	50 VS E
SCAN RATE (MV/S)	.17
THRESHOLD I (uA/cm^2)	5000
CONDITION E (MV)	PASS
CONDITION T (S)	PASS
INIT DELAY (MV/S OR S)	300 S

SAMPLE PARAMETERS

AREA (CM^2)	4.39
EQ WT (GM)	PASS
DENSITY (GM/CM^3)	PASS
CATHODIC TAFEL (MV)	PASS
ANODIC TAFEL (MV)	PASS

DATA SCALE

ECORR	-179
MV/PT	4
DATA MAX	6082.005
DATA MIN	-13507973
ARS MIN	3.872437E-03
ARS MAX	6082.005

LEGEND

825CRV3 ALLOY 825 HH4371FG
0.5 M NaCl 85 PPM HCO₃
20 PPM SO₄ 10PPM NO₃ 2 PPM F
600 SIC FINISH FULLY IMMERSSED
9/10/93

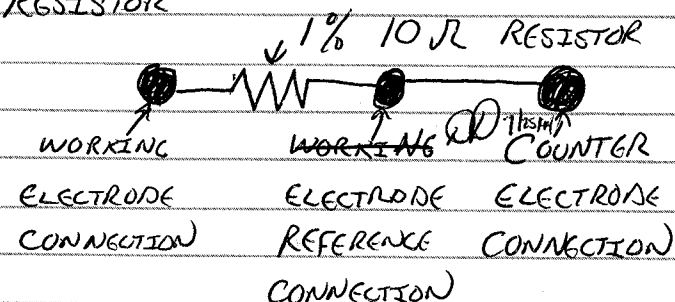
Dr. D
9/10/93

4/5/94

10 OHM 194

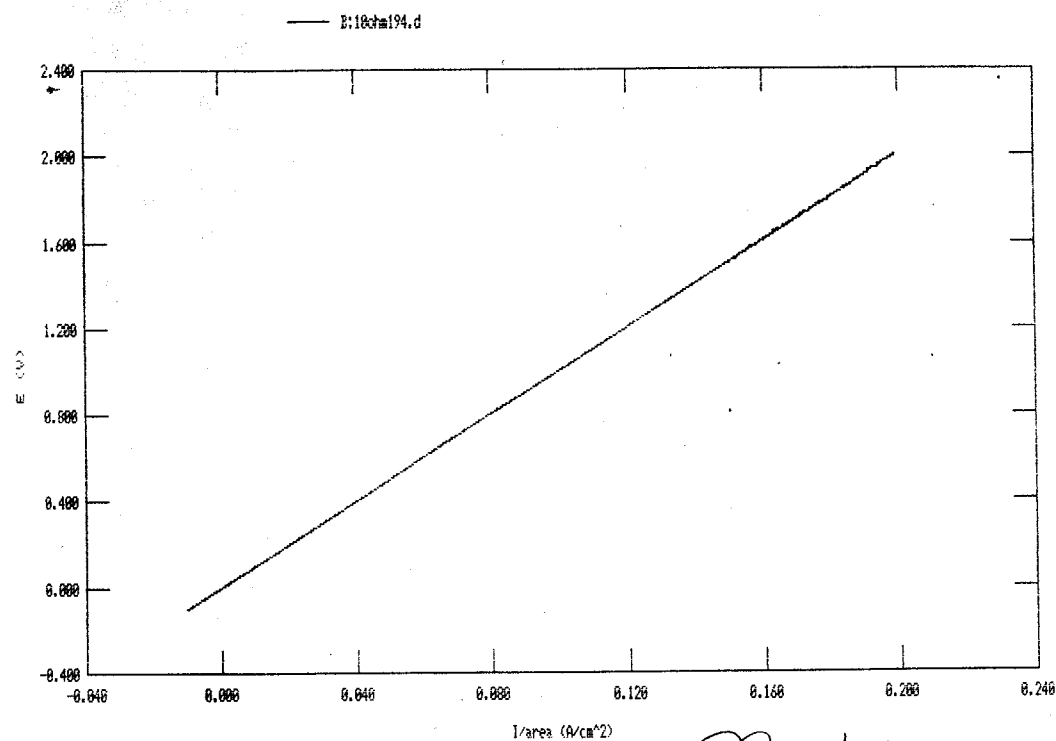
OBJECTIVE: VERIFY PERFORMANCE OF EG&G
~~VERA~~ ^{7/25/94} ~~Q~~ VERSASTAT AND MODEL 352
 CORROSION SOFTWARE.

SPECIMEN: DUMMY CELL WITH 1% 100 OHM
 RESISTOR



PROCEDURE: CONNECT POTENTIOSTAT TO
 RESISTOR AS SHOWN ABOVE AND SCAN
 FROM -100 mV TO 2 V. POTENTIAL
 VS. CURRENT PLOT SHOULD BE STRAIGHT
 LINE WITH SLOPE EQUAL TO RESISTANCE.

RESULTS: SHOWN BELOW ON GRAPH: RUN DATE 11/10/94



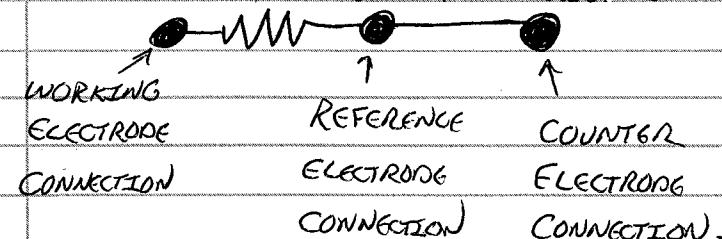
DD 4/5/94

4/5/94

10 OHM 194

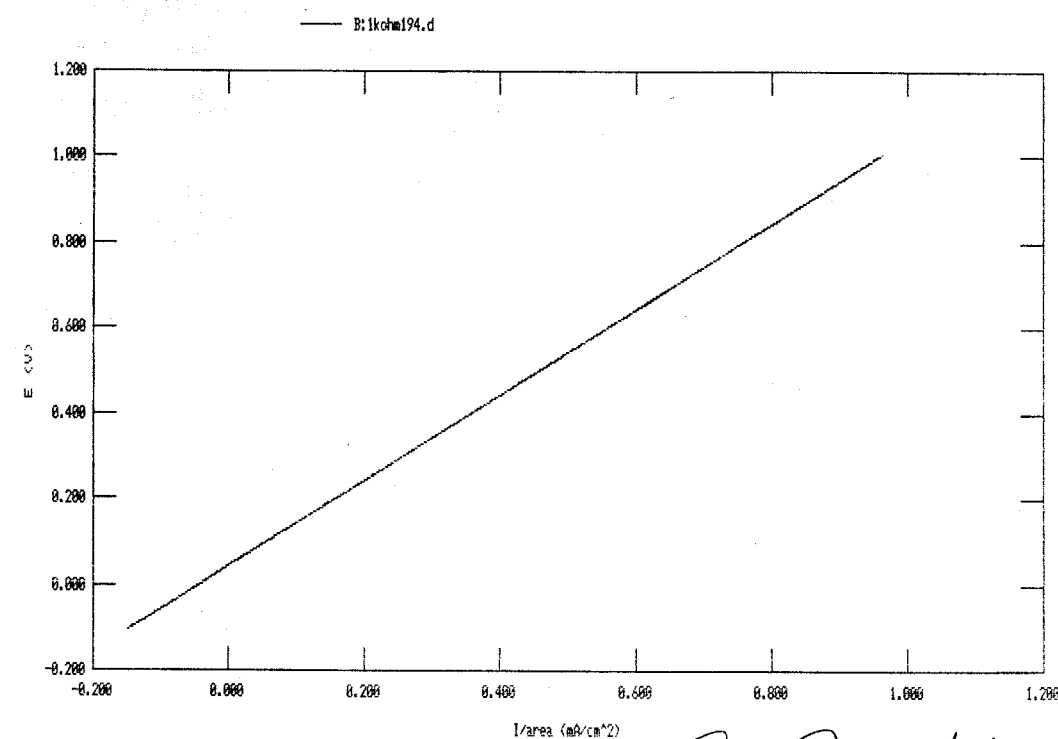
OBJECTIVE: VERIFY PERFORMANCE OF EG&G VERSASTAT
 AND MODEL 352 CORROSION SOFTWARE

SPECIMEN: DUMMY CELL WITH 1% 1000 OHM
 RESISTOR MEASURED RESISTANCE = 1.00045 K OHM
 & 1.00045 K OHM RESISTOR



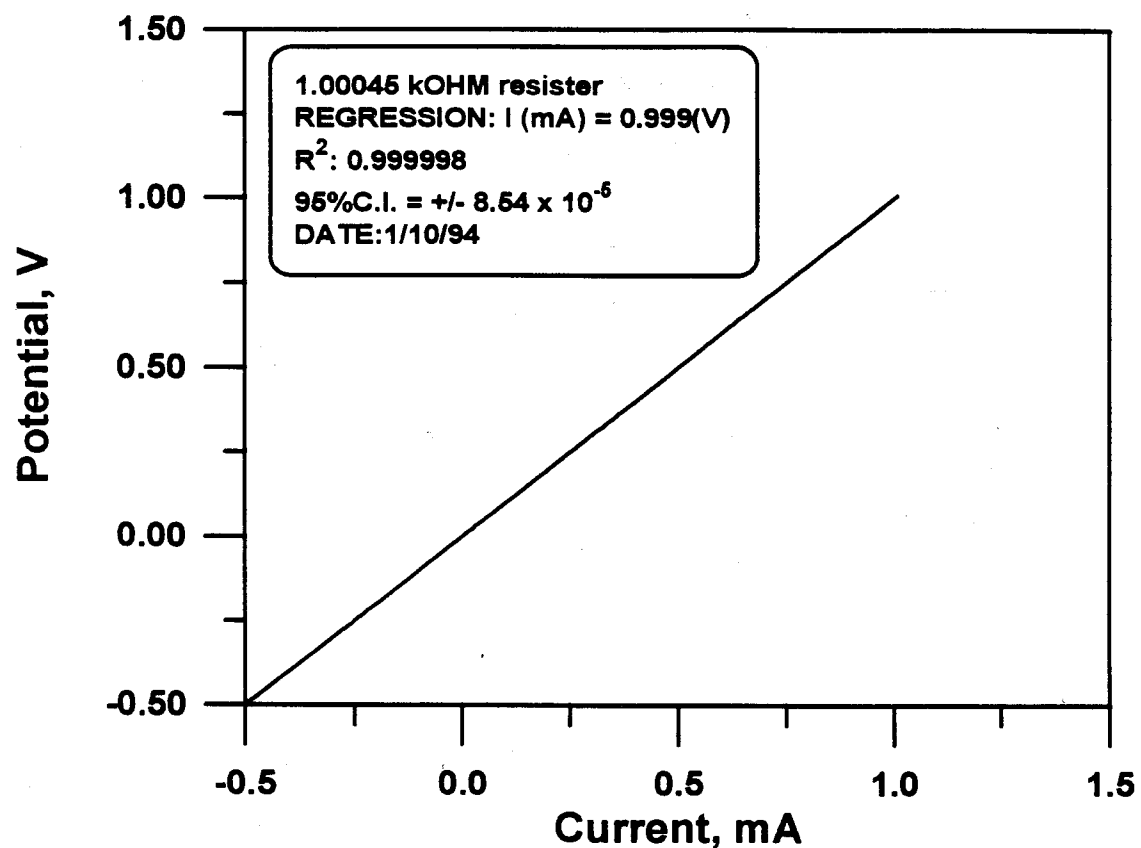
PROCEDURE: CONNECT POTENTIOSTAT TO RESISTOR
 AS SHOWN ABOVE AND SCAN FROM -0.100 V
 TO 1.00 V AT 1.0 mV/SECOND. SLOPE SHOULD
 BE EQUAL TO RESISTANCE ON E vs I PLOT.

RESULTS: SHOWN BELOW AND ON PAGE 208
 TEST DATE 11/10/94



DD 4/5/94

1 KOHM 194



D.D. 4/5/94

D.D. 4/5/94

4/5/94

ASTM G61

OBJECTIVE: DETERMINE PERFORMANCE OF VERSASTAT
AND MODEL ~~342~~ ^{7/25/94} ~~DD~~ 352 SOFTWARE.

SPECIMEN 304L ~~HT TOP~~ ^{7/25/94} ~~DD~~ HT T0954

600 S/C FINISH $d = 0.250$ ^{7/25/94} $L = 1.913$

START WT 11.0834g

END WT 11.05880g

SOLUTION 3.56% NaCl MADE BY ADDING

33.99871g NaCl LOT 926448A TO 920ml

DI WATER $T = 25^\circ\text{C}$ H₂ THERMO 0323008

START pH 5.874

END pH 6.730

POTENTIOSTAT EG&G VERASTAT DATA SAVED

AS ASTM G61.DAT

REFERENCE ELECTRODE FISHER 13-620-S1 SN 3106343

E_{corr} -250mV REINLEY 617

E_{PT} +119mV "

SOLUTION PURGED WITH N₂

SPECIMEN NOT COMPLETELY IMMERSSED. IMMERSSED
AREA = 8.0 cm²

POST TEST INSPECTION REVEALED PITS ON
SPECIMEN SURFACE

POTENTIAL VERSUS CURRENT DENSITY CURVE

ON PAGE 210 RUN PARAMETERS PAGE 210

DATA COLLECTED WITH EG&G M352 CORROSION

SOFTWARE ~~IN~~ ^{7/25/94} ~~DD~~ USING CYCLIC POLARIZATION

SETUP

E_{PT} = 300mV_{SCG}

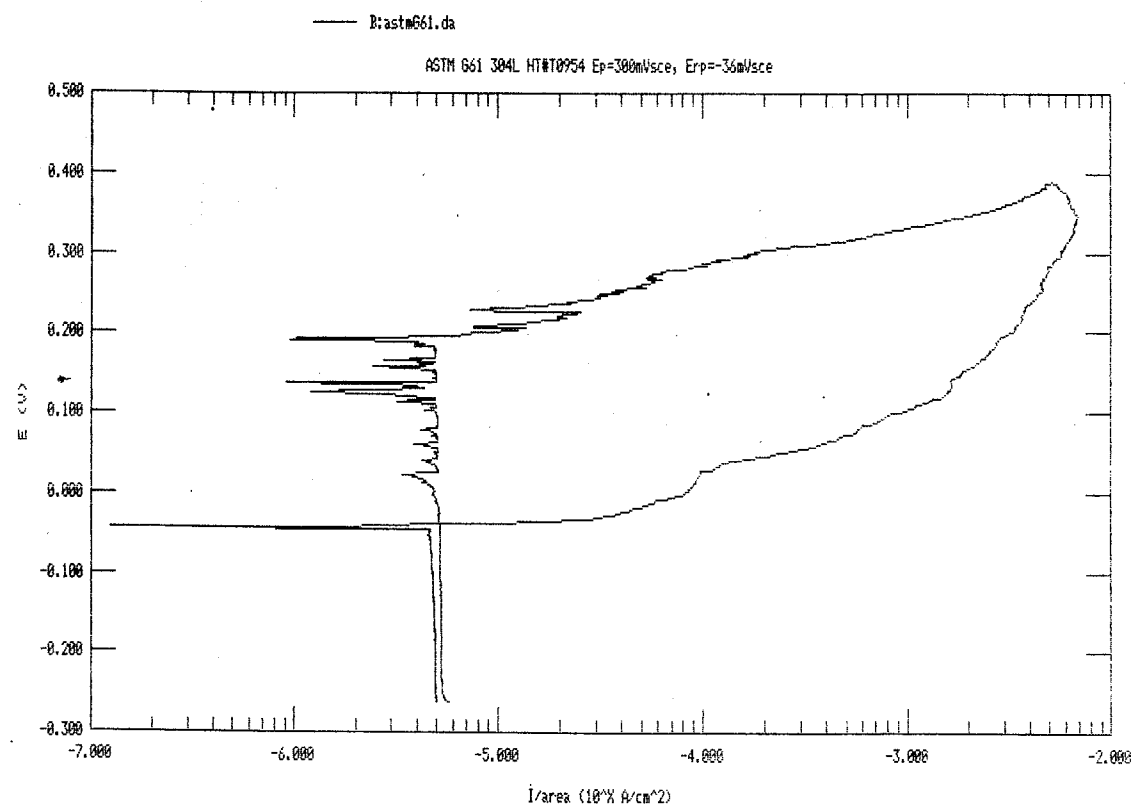
E_{RP} = -36mV_{SCG}

TEST DATE 1/12/94

D.D. 4/5/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc
Scan Rate	SR	0.1670	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	1.000	mV	Step Time	ST	5.988	s
No. of Points	NP	1304					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.2630	V

Handwritten signature 4/5/94



Handwritten signature 4/5/94

4/5/94

ASTM G61 B

OBJECTIVE : DETERMINE PERFORMANCE OF VERSASTAT
AND MODEL 352 SOFTWARE.

SPECIMEN 304L HT T0954 600 S.C FINISH

$L = 1.914"$ $d = 0.244"$

START WT 10.9288g

END WT 10.90040g

SOLUTION 3.56 WT % NaCl MADE BY ADDING
34.00247 g NaCl LOT 926448A TO 920ml

DI WATER T=25°C H₂ THERMO 0323008

SOLUTION PURGED WITH N₂

START pH 5.843

END pH 9.545

POTENTIOSTAT EG&G ~~VERA~~ ^{7/25/94} ~~VERA~~ VERSASTAT

DATA SAVED AS ASTM G61 B.DAT

REFERENCE ELECTRODE FISHER 13-620-S1 ^{7/25/94} ~~SN~~ SN 3106343

SPECIMEN COMPLETELY IMMERSSED. TOTAL AREA =
10 cm²

E_{corr} -571 mV KEITNEY 617

E_{pr} +216 mV

POST TEST INSPECTION REVEALED PITS AND
CREVICE CORROSION AT SPECIMEN/PTEE JOINT.
POTENTIAL VERSES CURRENT DENSITY AND

RUN PARAMETERS P212

DATA COLLECTED USING EG&G M352 SOFTWARE
USING CYCLIC POLARIZATION SETUP

E_{pr} = 58 mV SCE

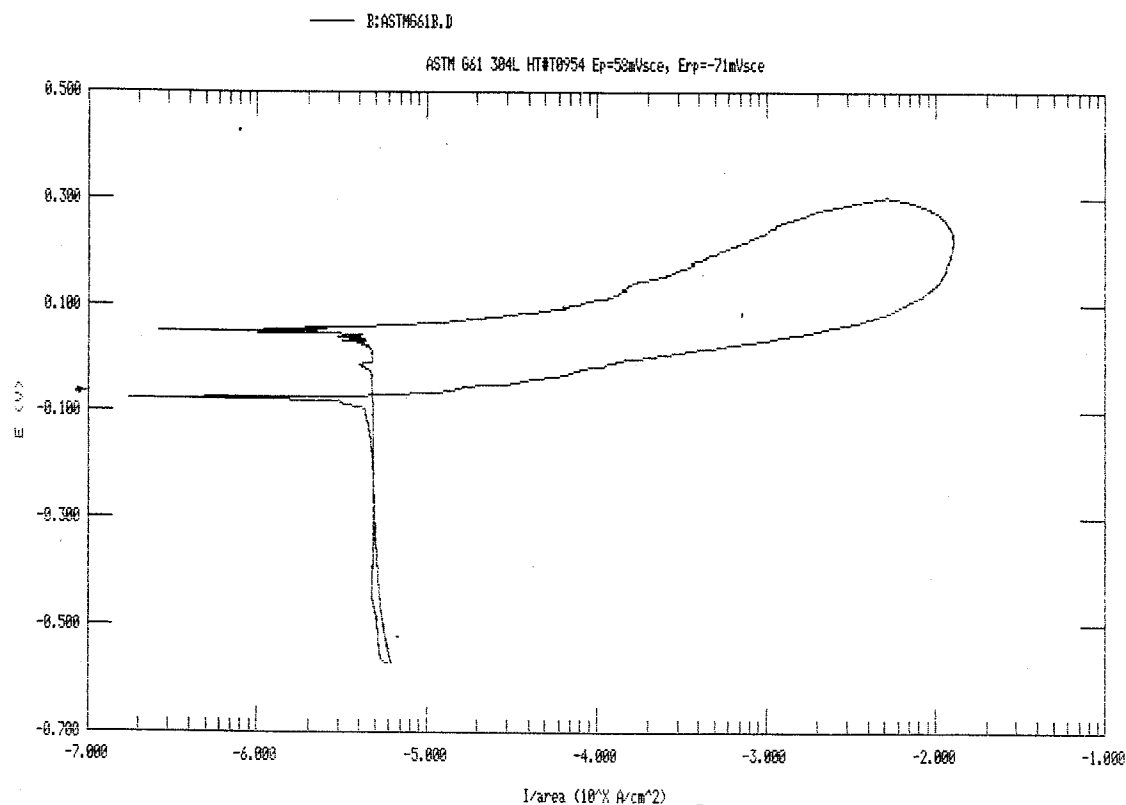
ERP = -71 mV SCE

TEST DATE 1/14/94

Handwritten signature 4/5/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc
Scan Rate	SR	0.1670	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	1.000	mV	Step Time	ST	5.958	s
No. of Points	NP	1748					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.5718	V

[Signature] 4/5/94



[Signature] 4/5/94

4/5/94

36 GRIT

OBJECTING DETERMINE PITTING AND REPASSIVATION
POTENTIALS FOR ALLOY 825 WITH A 36 GRIT FINISH.
SPECIMEN ALLOY 825 HH4371FC POSTED
CUBE SPECIMEN AREA = 8.60 cm²
START WT 27.02934g
END WT 27.01177g
SOLUTION 1000 ppm Cl⁻ 85 ppm HCO₃⁻ 20 ppm SO₄²⁻
10 ppm NO₃⁻ 2 ppm F⁻ 1000 ml AS FOLLOWS
1.64930 g NaCl LOT 926448A
0.11817 g NaHCO₃ LOT 897789
20 ml SO₄-1/94 STOCK SOLUTION P 66 IWPE-085
10 ml NO₃-1/94 " "
2 ml F-1/94 " "

DEAERATED WITH N₂ T= 95°C H₂ THERMO 0323008
START pH 8.275
END pH 9.470
POTENTIOSTAT EG&G VERSASTAT DATA SAVED AS
36 GRIT.DAT.

REFERENCE ELECTRODE FISHER B-620-SI SN 3106343
E_{corr} -688 mV KEITHLEY 617
E_{pt} -436 mV "
POST TEST INSPECTION REVEALED PITS ON SURFACES
WITH 36 GRIT FINISH. NO CREVICE CORROSION
OF SPECIMEN AT PTFE CONTACT.

GRAPH OF POTENTIAL VERSUS CURRENT DENSITY
AND RUN PARAMETERS ON PAGE 214.
DATA COLLECTED WITH EG&G M352 CORROSION
SOFTWARE USING CYCLIC POLARIZATION SETUP
E_{pt} = 566 mV_{SCE}
E_{rp} = 133 mV_{SCE}
TEST DATE 1/24/94

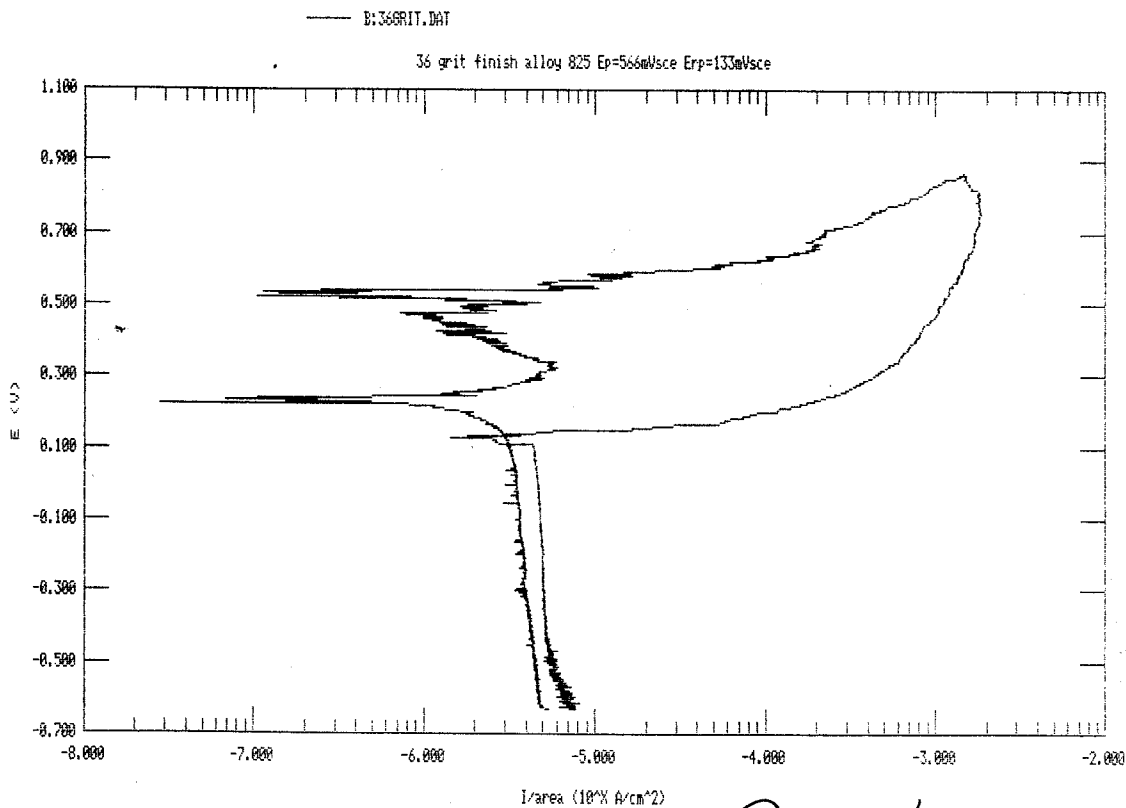
[Signature] 4/5/94

Cond. Time CT pass s Initial Pot. IP 0.0000 V oc
Cond. Pot. CP pass V Vertex 1 Pot. VI 20.00E-3 V oc
Initial Delay ID 1000 s I Threshold IT 5.000E-3 A/cm²
Final Pot. FP 0.0000 V oc

Scan Rate SR 0.1670 mV/s Curr. Range CR Auto
Scan Incr. SI 1.000 mV Step Time ST 5.988 s
No. of Points NP 2999

Line Sync. LS no GI Time Const. TC Off
Rise Time RT high stability IR Mode IR none
Working Elec. WE Solid Filter FL Off
Sample Area AR 8.600 cm² Ref. Elec. RE SCE 0.2415 V
Density DE 7.800 g/ml Equiv. Wt. EW 0.0000 g
Open Circuit OC -0.6320 V

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Handwritten signature 4/5/94

4/5/94

825CR61A

OBJECTIVE DETERMINE PITTING AND REPASSIVATION
POTENTIAL OF 61% COLD ROLLED ALLOY 825 WITH
A 36 GRIT SURFACE FINISH
SPECIMEN ALLOY 825 HH437IFG 61% COLD ROLLED
36 GRIT FINISH IMMERSED AREA - 10.6 cm²
SPECIMEN CONNECTION MADE WITH SPOTWELD TO
1/8" ALLOY 825 ROD. WELD REGION ABOVE SOLUTION
DURING TEST

SOLUTION 1600 ppm Cl⁻ 85 ppm HCO₃⁻ 20 ppm SO₄²⁻
10 ppm NO₃⁻ 2 ppm F⁻ 1000 ml AS FOLLOWS
1.64831 g NaCl LOT 926448A
0.11793 g NaHCO₃ LOT 897789
20 ml SO₄ - 1/94 STOCK SOLUTION p66 IWPE085
10 ml NO₃ - 1/94 " "
2 ml F - 1/94 " "

DEAERATED WITH N₂ T=95°C Hg THERMO 0323008
START pH 8.234
ENA pH 9.336
POTENTIOSTAT EG&G VERSASTAT. DATA SAVED
AS 825CR61A.DAT

REFERENCE ELECTRODE FISHER 13-620-S1 SN 3106343
E_{corr} -530 mV KETINLEY 617
E_{PT} -340 mV "

POST TEST EXAMINATION REVEALED PITS ON
SPECIMEN SURFACE. 7/25/94

GRAPH OF POTENTIAL ~~VERSUS~~ *DD* VERSUS CURRENT
DENSITY ON PAGE 216.

DATA COLLECTED USING EG&G CYCLIC POLARIZATION
SETUP IN ~~M342~~ *DD* M352 CORROSION SOFTWARE
E_{PT} = 516 mV_{SCE} 7/25/94
E_{RP} = 80 mV_{SCE}
TEST DATE 1/27/94

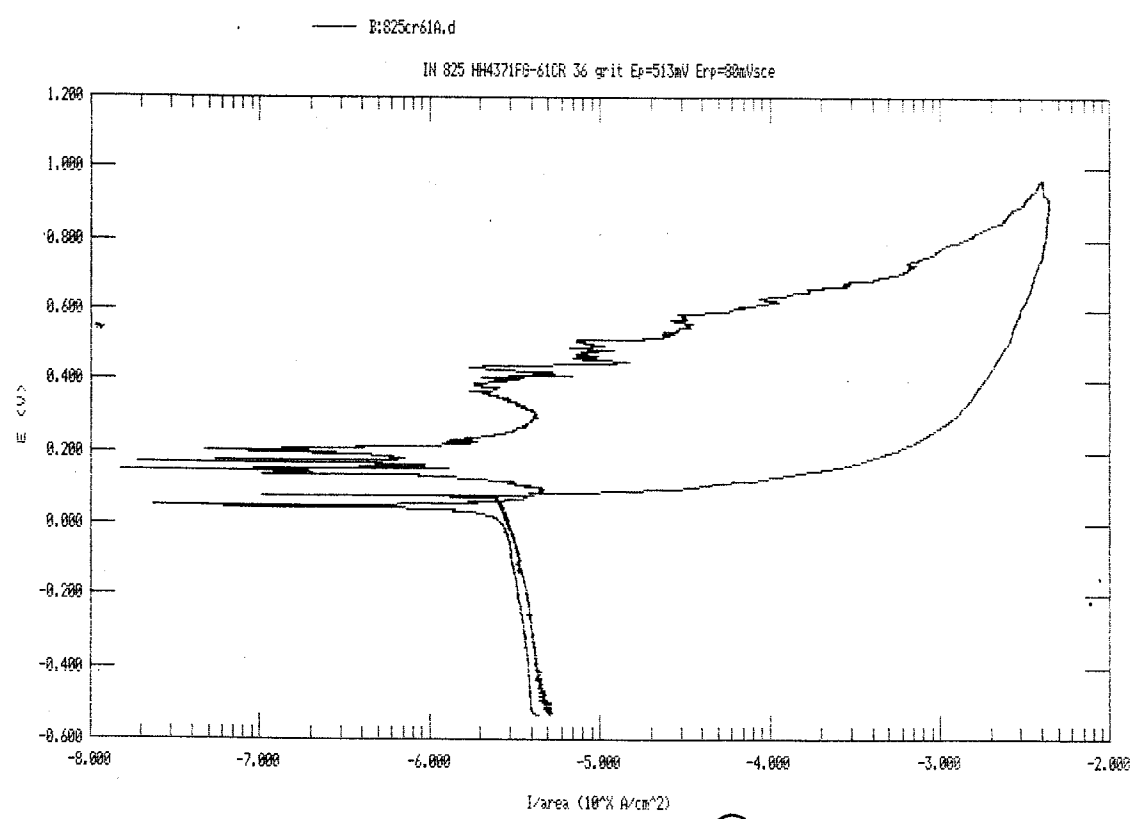
Handwritten signature 4/5/94

Cond. Time CT pass s Initial Pot. IP 0.0000 V oc
Cond. Pot. CP pass V Vertex 1 Pot. VI 20.00E-3 V oc
Initial Delay ID 1000 s I Threshold IT 5.000E-3 A/cm^2
Final Pot. FP 0.0000 V oc

Scan Rate SR 0.1670 mV/s Curr. Range CR Auto s
Scan Incr. SI 1.000 mV Step Time ST 5.988
No. of Points NP 2999

Line Sync. LS no GI Time Const. TC Off
Rise Time RT high stability IR Mode IR none
Working Elec. WE Solid Filter FL Off
Sample Area AR 10.60 cm^2 Ref. Elec. RE SCE 0.2415 V
Density DE 7.800 g/ml Equiv. Wt. EW 0.0000 g
Open Circuit OC -0.5310 V

[Signature] 4/5/94



[Signature] 4/5/94

4/5/94

825 CR 46A

OBJECTIVE. DETERMINE PITTING AND REPASSIVATION
POTENTIAL FOR ALLOY 825 46% COLD ROLLED
WITH A 36 GRIT SURFACE FINISH.

SPECIMEN ALLOY 825 HH4371FG 46% COLD ROLLED
36 GRIT FINISH IMMERSED AREA 10.6 CM^2

SPECIMEN CONNECTION MADE WITH SPOTWELD TO
1/2" ALLOY 825 ROD. WELD REGION ABOVE SOLUTION
LEVEL DURING TEST.

SOLUTION 1000 PPM Cl^- 85 PPM HCO3^- 20 PPM SO4^2-
10 PPM NO3^- 2 PPM F^- 1000 ml AS FOLLOWS.

1.64871 g NaCl LOT 926448A
0.11916 g NaHCO3 LOT 897789
20 ml SO4 - 1/94 STOCK SOLUTION IWPE 085 p66
10 ml NO3 - 1/94 " " "
2 ml F - 1/94 " "

DEAERATED WITH N2 T=95°C N2 THERMO 0323008

START pH 8.234

END pH 9.621

POTENTIOSTAT EG&G VERSASTAT DATA SAVED AS
825CR46A.DAT

Ecorr -557 mV KEITHLEY 617

Ept -281 mV " "

POST TEST EXAMINATION REVEALED PITS ON
SPECIMEN SURFACE.

GRAPH OF POTENTIAL VS. CURRENT DENSITY
ON PAGE 218

DATA COLLECTED WITH EG&G M352 CORROSION

SOFTWARE USING CYCLIC POLARIZATION SETUP

E_{PIT} = 497 mV_{SCE}

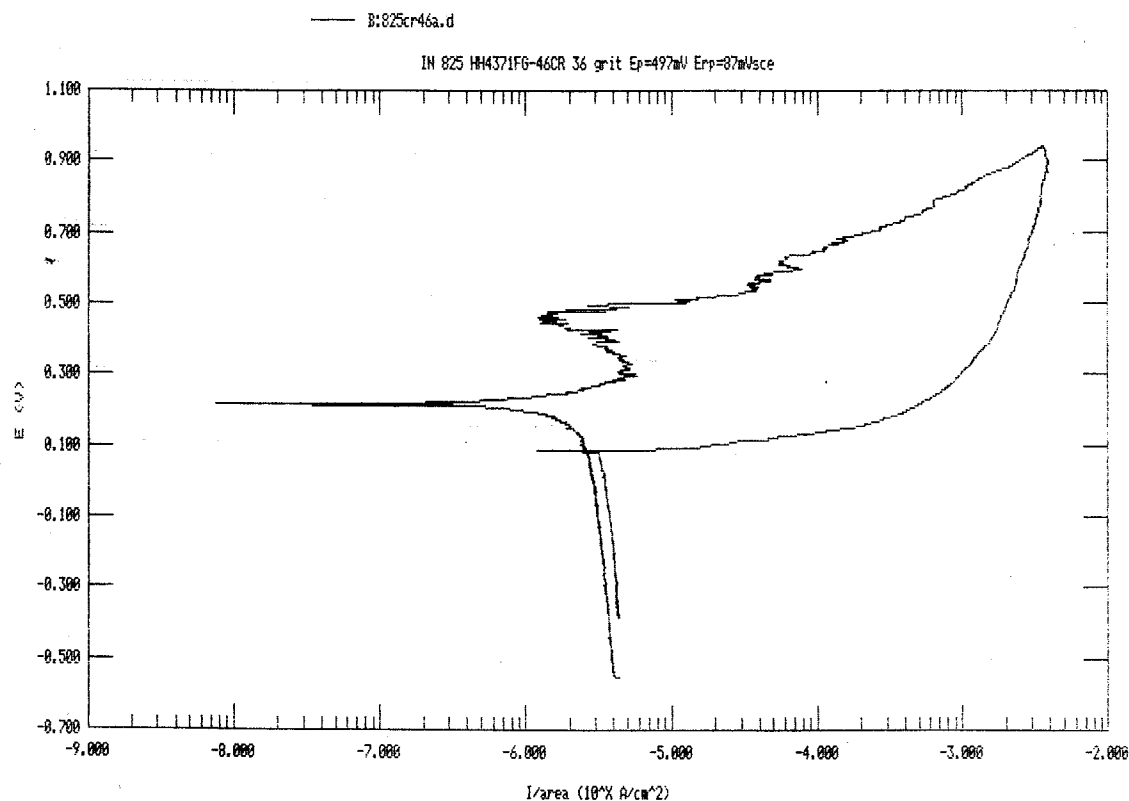
E_{RP} = 87 mV_{SCE}

TEST DATE 1/28/94

[Signature] 4/5/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	300	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc
Scan Rate	SR	0.1670	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	1.000	mV	Step Time	ST	5.988	s
No. of Points	NP	2827					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	10.60	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.5550	V

Paul D 4/5/94



Paul D 4/5/94

4/5/94

825CR36A

OBJECTIVE DETERMINE PITTING AND REPASSIVATION
POTENTIAL OF 36% COLD ROLLED ALLOY 825
WITH A 36 GRIT FINISH.

SPECIMEN ALLOY 825 HH4371FG 36% COLD ROLLED
36 GRIT FINISH IMMERSED AREA 10.80 CM²
SPECIMEN CONNECTION MADE WITH SPOTWELD TO
1/8" ALLOY 825 ROD. WELD REGION ABOVE
SOLUTION LEVEL DURING TEST.

SOLUTION 1000 PPM Cl⁻ 85PPM HCO₃⁻ 20PPM SO₄²⁻ 10PPM NO₃⁻
2PPM F⁻ 1000 ml AS FOLLOWS
1.64855 g NaCl LOT 926448A
0.11793 g NaHCO₃ LOT 897789
20 ml SO₄ - 2/94 STOCK SOLUTION IWPE 085 P.82
10 ml NO₃ - 2/94 STOCK SOLUTION IWPE 085 P.82
2 ml F⁻ - 2/94 STOCK SOLUTION IWPE 085 P.82
+ DI WATER TO 1000 ml. T=95°C N₂ THERMO 0323008

DEAERATED WITH N₂

START pH 8.244

END pH 9.904

POTENTIOSTAT EG&G VERSASTAT DATA SAVED
AS 825CR36A.DAT

REFERENCE ELECTRODE FISHER 13-620-SI SN 3106343

E_{corr} -552 mV KEITHLEY 617

E_{pt} -302 mV

POST TEST EXAMINATION REVEALED PITS ON
SPECIMEN SURFACE

GRAPH OF POTENTIAL VERSUS CURRENT DENSITY
ON PAGE 220.

DATA COLLECTED WITH EG&G M352 CORROSION
SOFTWARE USING CYCLIC POLARIZATION SETUP

E_{AT} 460 mV SCE

E_{RP} 106 mV SCE

TEST DATE 2/4/94

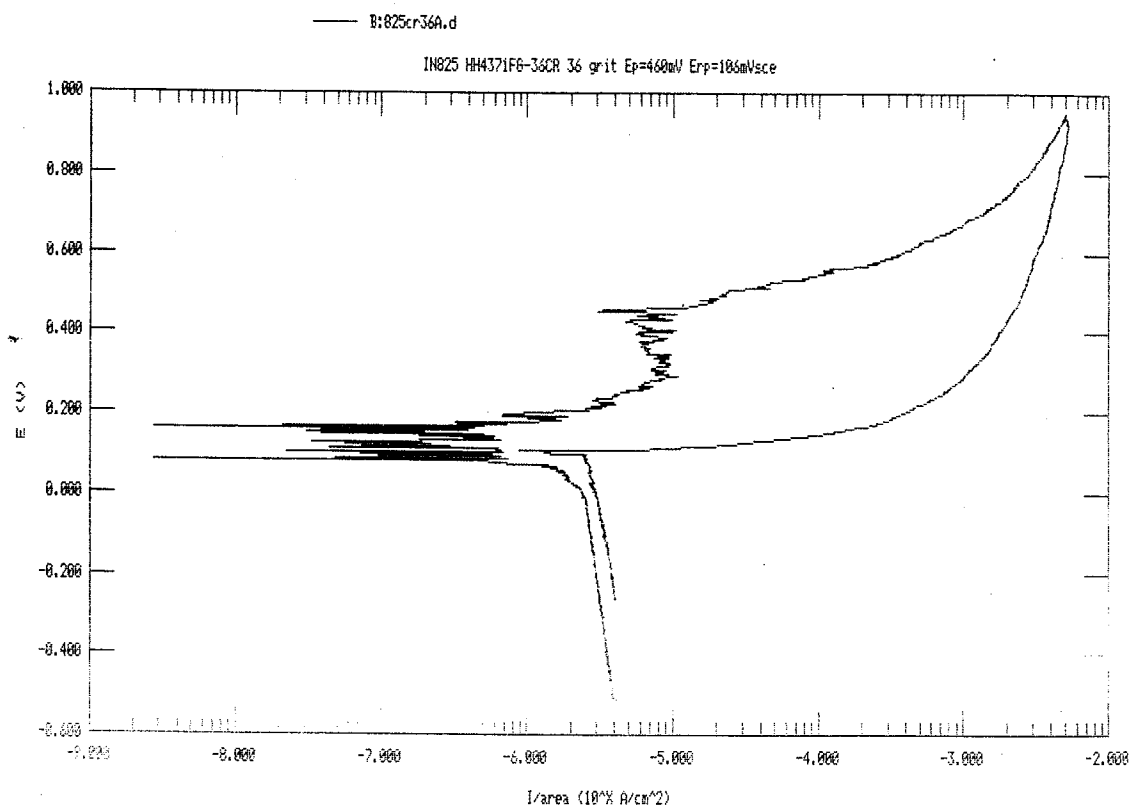
Paul D 4/5/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	1800	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc

Scan Rate	SR	0.1670	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	1.000	mV	Step Time	ST	5.988	s
No. of Points	NP	2677					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	10.80	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.5150	V

Paul D 4/5/94



Paul D 4/5/94

4/5/94

825CR20A

OBJECTIVE DETERMINE PITTING AND REPASSIVATION POTENTIALS OF 20% COLD ROLLED ALLOY 825 WITH A 36 GRIT FINISH.

SPECIMEN ALLOY 825 HH4371FG 20% COLD ROLLED 36 GRIT FINISH IMMERSED AREA = 11.40 CM²

SPECIMEN CONNECTION MADE WITH SPOTWELD TO 1/8" ALLOY 825 ROD WELD REGION ABOVE SOLUTION DURING TEST.

SOLUTION 1000 PPM Cl⁻ 85 PPM NO₃⁻ 20 PPM SO₄²⁻ 10 PPM NO₃⁻ 2 PPM F⁻ 1000 ml AS FOLLOWS

1.65003g NaCl LOT 926448A

0.11791g NaHCO₃ LOT 897789

20ml SO₄²⁻ 2/94 STOCK SOLUTION IUPAC 085 p 82

10ml NO₃⁻ 2/94

2ml F⁻ 2/94

+ DI WATER TO 1000ml PURGED WITH N₂ T=95°C N₂ THERMO 0323008

START pH 8.191

END pH 9.565

POTENTIOSTAT ~~EG&G~~ EG&G VERSASTAT

DATA SAVED AS 825CR20A.DAT

REFERENCE ELECTRODE FISHER 13-620-SI SN 3106343

E_{corr} -637 mV KEITHLEY 614

E_{pit} -335 mV KEITHLEY 614

POST TEST ~~Q~~ TEST EXAMINATION REVEALED PITS ON SPECIMEN SURFACE

GRAPH OF POTENTIAL vs. CURRENT DENSITY

AND RUN PARAMETERS ON PAGE 222

DATA COLLECTED WITH EG&G M352 CORROSION

SOFTWARE USING CYCLIC POLARIZATION SETUP

E_{pit} = 536 mV/sec

E_{rp} = 121 mV/sec

TEST DATE 2/7/94

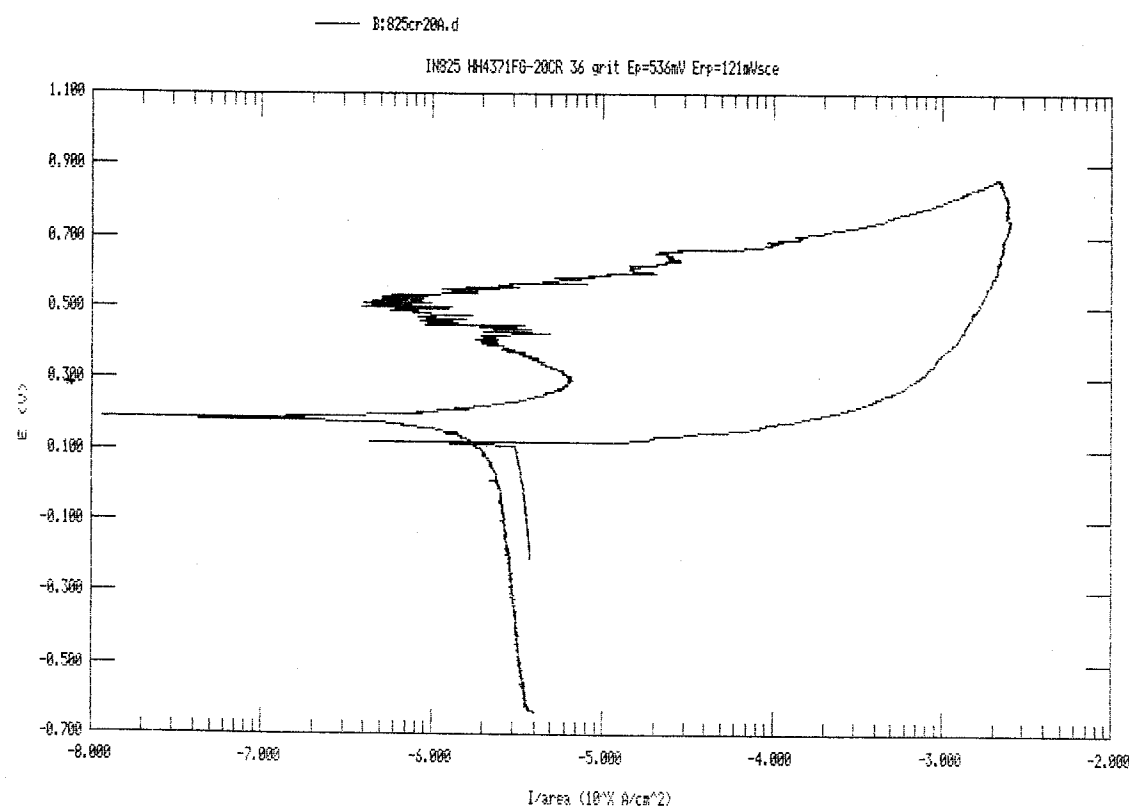
Paul D 4/5/94

Cond. Time CT pass s Initial Pot. IP 0.0000 V oc
 Cond. Pot. CP pass V Vertex 1 Pot. VI 20.00E-3 V oc
 Initial Delay ID 60 s I Threshold IT 5.000E-3 A/cm²
 Final Pot. FP 0.0000 V oc

Scan Rate SR 0.1670 mV/s Curr. Range CR Auto
 Scan Incr. SI 1.000 mV Step Time ST 5.988 s
 No. of Points NP 2569

Line Sync. LS no SI Time Const. TC Off
 Rise Time RT high stability IR Mode IR none
 Working Elec. WE Solid Filter FL Off
 Sample Area AR 11.40 cm² Ref. Elec. RE SCE 0.2415 V
 Density DE 7.800 g/ml Equiv. Wt. EW 0.0000 g
 Open Circuit OC -0.6360 V

Paul D 4/5/94



Paul D 4/5/94

4/5/94

825CR61B

OBJECTIVE DETERMINING PITTING AND REPASSIVATION
 POTENTIAL OF 61% COLD ROLLED ALLOY 825
 WITH A 600 GRIT FINISH

SPECIMEN ALLOY 825 HH4371FG 61% COLD ROLLED
 600 GRIT FINISH IMMERSED AREA = 10.1 cm²

SPECIMEN CONNECTION MADE BY SPOT WELD TO
 1/8" ALLOY 825 ROD WELD REGION ABOVE

SOLUTION LEVEL DURING TEST.

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃⁻ 20 PPM SO₄²⁻
 10 PPM NO₃⁻ 2 PPM F⁻ 1000 ml MAKE AS FOLLOWS

1.64813 g NaCl LOT 926448A

0.11838 g NaHCO₃ LOT 897789

20 ml SO₄-2/94 STOCK SOLUTION JWP6085 P82

10 ml NO₃-2/94 " "

2 ml F⁻-2/94 " "

+ DI WATER TO 1000 ml PURGED WITH N₂

T=95°C N₂ THERMO 0323008

START pH 8.173

END pH 9.281

POTENTIOSTAT EG&G VERSASTAT DATA SAVED AS
 825CR61B.DAT

REFERENCE SCE ELECTRODE FISHER 13-620-S1 SN 3106343

E_{corr} -662 mV KEITHLEY 617

E_{PT} -327 mV " "

POST TEST EXAMINATION REVEALS PITS ON
 SPECIMEN SURFACE

POTENTIAL VS. CURRENT DENSITY AND RUN
 PARAMETERS p 224.

DATA COLLECTED WITH EG&G M352 CORROSION
 SOFTWARE USING CYCLIC POLARIZATION SETUP

E_{PT} = 634 mV SCE

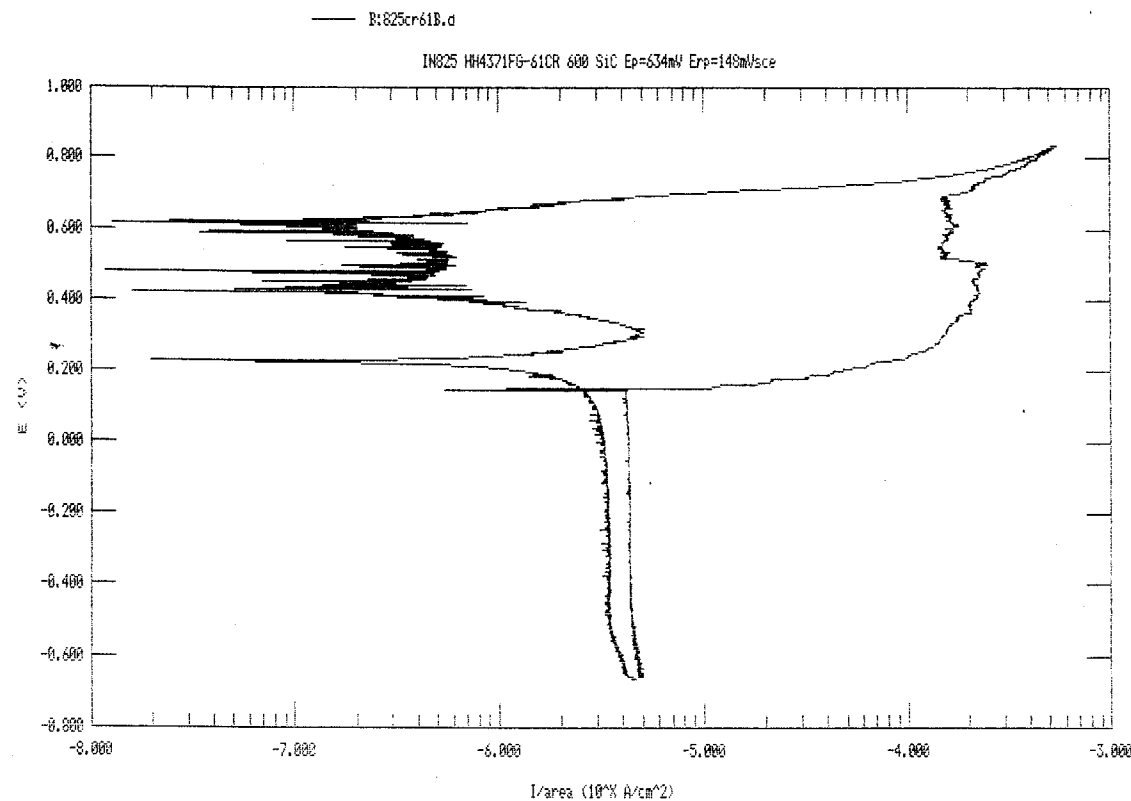
ERP = 148 mV SCE

TEST DATE 2/9/94

Paul D 4/5/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V _{oc}
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V _{oc}
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V _{oc}
Scan Rate	SR	0.1670	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	1.000	mV	Step Time	ST	5.988	s
No. of Points	NP	2999					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	10.10	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.6620	V

[Signature] 4/5/94



[Signature] 4/5/94

4/5/94

825CR46B

OBJECTIVE DETERMINING PITTING AND REPASSIVATION POTENTIALS FOR 46% COLD ROLLED ALLOY 825 WITH A 600 GRIT FINISH.

SPECIMEN ALLOY 825 HH4371FG 46 % COLD ROLLED 600 GRIT FINISH IMMERSED AREA = 10.40cm²
SPECIMEN CORROSION MADE BY SPOTWEALED 1/8" ALLOY 825 ROD WELD REGION ABOVE SOLUTION LEVEL DURING TEST.

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃⁻ 20 PPM SO₄⁻
10 PPM NO₃⁻ 2 PPM F⁻ 1000 ml AS FOLLOWS
1.64849 g NaCl LOT 926448A
0.11787 g NaHCO₃ LOT 897789
20 ml SO₄-2/94 STOCK SOLUTION TWA8 OBS p82
10 ml NO₃-2/94 " "
2 ml F⁻-2/94 " "

+ DI WATER TO 1000ml PURGED WITH N₂
T = 95°C H₂ THERMO 0323008

START pH 8.183

END pH 9.431

POTENTIOSTAT EG&G VERSASTAT

DATA SAVED AS 825CR46B.DAT

REFERENCE SCE FISHER 13-620-SI SN 3106343

E_{corr} = 640 mV KEITHLEY 617

E_{pr} = 297 mV

POST TEST EXAMINATION REVEALED PITS ON

SPECIMEN SURFACE

POTENTIAL VS CURRENT DENSITY AND RUN

PARAMETERS p226.

DATA COLLECTED WITH EG&G M352 CORROSION

SOFTWARE USING CYCLIC POLARIZATION SETUP

E_{pr} = 661 mV SCE

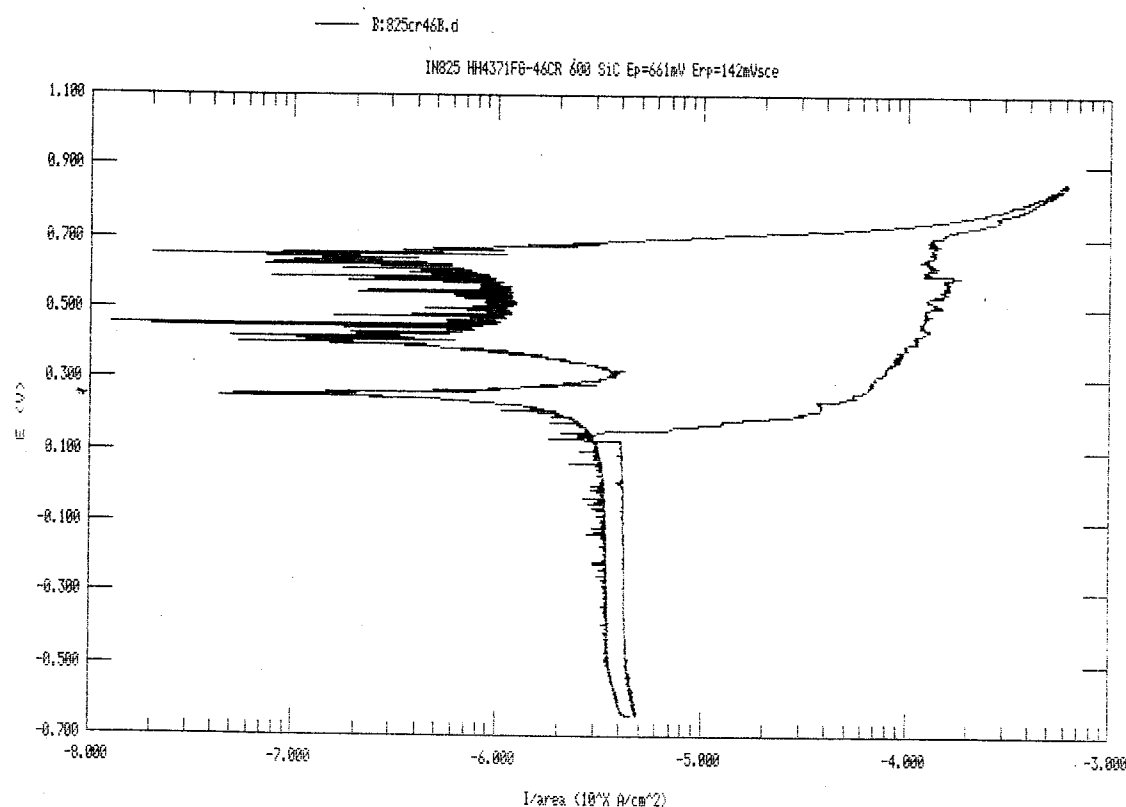
E_{rp} = 142 mV SCE

TEST DATE 2/10/94

[Signature] 4/5/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc
Scan Rate	SR	0.1670	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	1.000	mV	Step Time	ST	5.988	s
No. of Points	NP	2999					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	10.40	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.6430	V

Quid 4/5/94



Quid 4/5/94

4/5/94

825CR36B

OBJECTIVE DETERMINING PITTING AND REPASSIVATION POTENTIALS FOR 36% COLD ROLLED ALLOY 825 WITH A 600 GRIT FINISH.

SPECIMEN ALLOY 825 HH4371FG 36% COLD ROLLED 600 SiC FINISH IMMERSED AREA = 10.80 cm²
SPECIMEN CONNECTION MADE BY SPOTWELDED 1/8" ALLOY 825 ROD WELD REGION ABOVE SOLUTION LEVEL DURING TEST

SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃⁻ 20 PPM SO₄²⁻
10 PPM NO₃⁻ 2 PPM F⁻ 1000 ml MADE AS FOLLOWS
1.64928g NaCl LOT 926448A
0.11833g NaHCO₃ LOT 897789
20ml SO₄-2/94 STOCK SOLUTION IUPAC 085 p 82
10ml NO₃-2/94
2ml F-2/94

+ DI WATER TO 1000 ml DEAERATED WITH N₂
T=95°C H₂ THERMO 0323008
START pH 8.156
END pH 9.366

POTENTIOSTAT EG&G VERSASTAT
DATA NOT SAVED DUE TO OPERATOR ERROR
REFERENCE SCE FISHER 13-620-SI SN 3106343
E_{corr} -577 mV KEITHLEY 617
E_{pt} -273 mV " "

POST TEST EXAMINATION REVEALED PITS ON SPECIMEN SURFACE.

POTENTIAL VS CURRENT DENSITY AND RUN PARAMETERS P228.

DATA COLLECTED WITH EG&G M352 CORROSION SOFTWARE USING CYCLIC POLARIZATION SETUP

E_{pr} 634 mV SCE

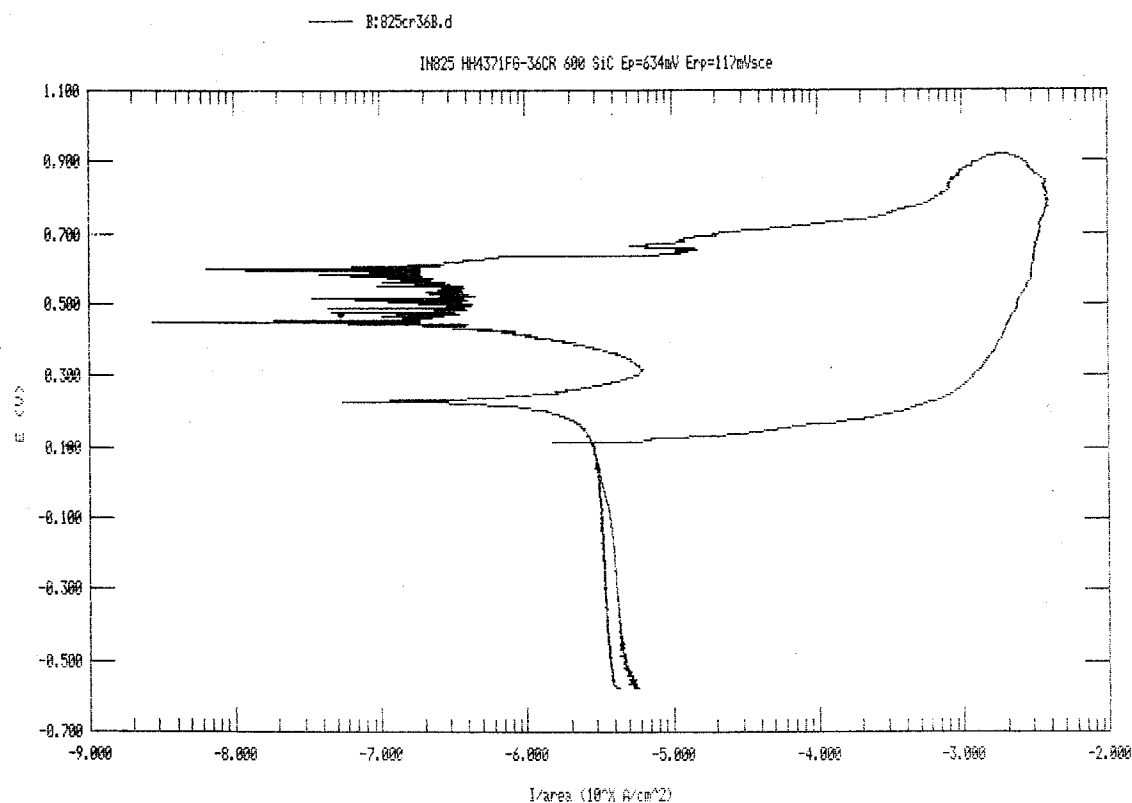
E_{rp} 117 mV SCE

TEST DATE 2/11/94

Quid 4/5/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	1800	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc
Scan Rate	SR	0.1670	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	1.000	mV	Step Time	ST	5.998	s
No. of Points	NP	2999					
*Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	10.80	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.5770	V

Paul D 4/5/94



Paul D 4/5/94

4/8/94

316CREV

OBJECTIVE DETERMINING CREVICE CORROSION INITIATION
AND REPASSIVATION POTENTIALS ON 316L IN
1 MOLAR Cl⁻ AT PH 4.0

SPECIMEN 316L P80746 600 GRIT FINISH
L = 1.915 d = 0.249 3/8" WING PTFE
CREVICE DEVICE PLACED ON LOWER NARE OF
SPECIMEN TOTAL EXPOSED SURFACE AREA 8.0cm²

SOLUTION 1 MOLAR Cl⁻ AS NaCl AP PH 4.0
2000 ml MAKE BY 116.88424g NaCl LOT 935535
0.32ml 0.02g/ml HCl + 2 ~~ml~~ DI WATER TO
2000 ml DEAERATED WITH N₂ 7/25/94

START PH 3.970
END PH 5.037

POTENTIOSTAT EG&G VERSASTAT

DATA NOT SAVED

REFERENCE ELECTRODE SCE 13-620-51 SN 3106343

E_{corr} -327mV

E_{pt} +35mV

POST TEST INSPECTION REVEALED CREVICE CORROSION
UNDER PTFE CREVICE AND PITS ON UNCREVICED
IMMERSED PORTIONS OF THE SPECIMEN
POTENTIAL VS. CURRENT DENSITY AND RUN
PARAMETERS P230

T=95°C N₂ THERMO 0323008

DATA COLLECTED WITH EG&G M352 CORROSION

SOFTWARE USING CYCLIC POLARIZATION SETUP

E_{PET/CREV} -146mV/SCE

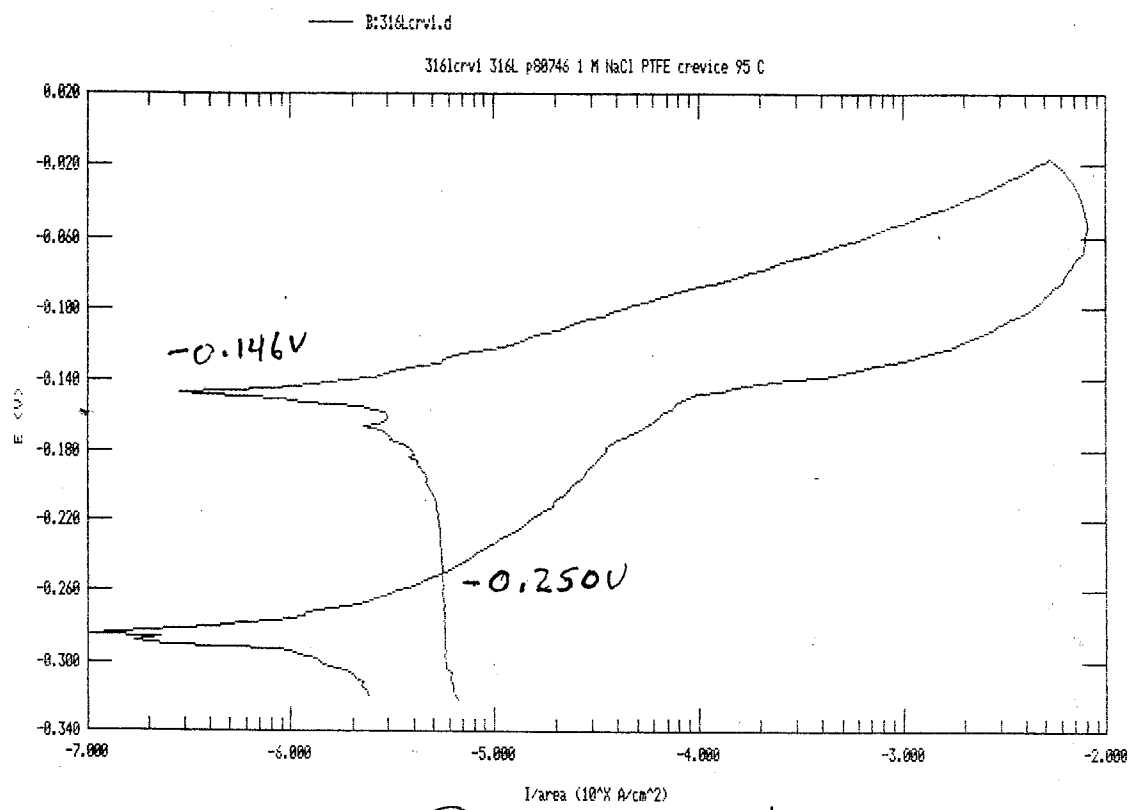
E_{RP} -250mV/SCE

TEST DATE 4/15/94

Paul D 4/18/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc
Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	2.000	mV	Step Time	ST	11.98	s
No. of Points	NP	306					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	8.0000	g
				Open Circuit	OC	-0.3220	V

Paul D 4/18/94



Paul D 4/18/94

4/19/94

316LNOCV

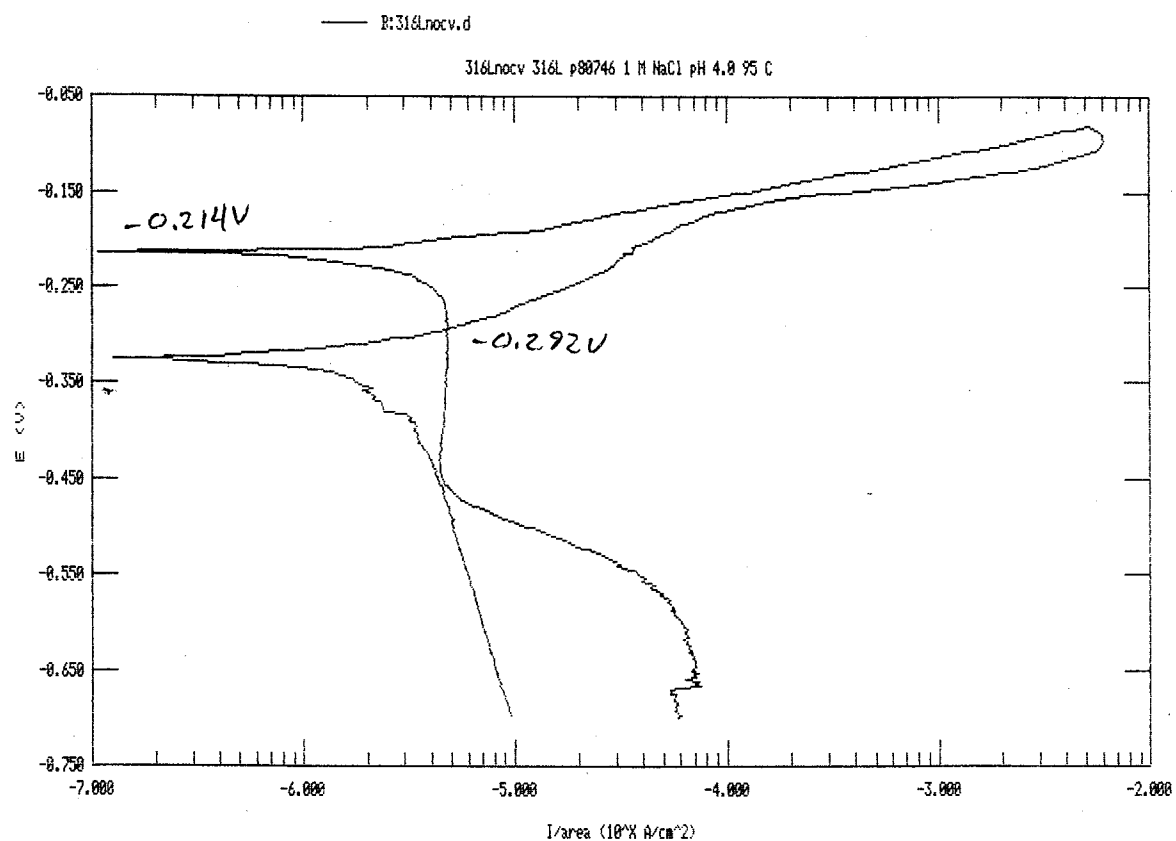
OBJECTIVE DETERMINING PITTING CORROSION
INITIATION AND REPASSIVATION POTENTIALS
FOR 316L IN 1MOLAR Cl⁻ AT pH 4.0
SPECIMEN 316L P80746 600 S.C FINISH
 $\rho = 1.915$ $d = 0.247$ IMMERSED AREA = 8.0cm²
SOLUTION 1MOLAR NaCl AT pH 4.0 MADE
WITH 58.45024 g NaCl LOT 935535 AND
0.15ml 0.02g/ml HCl + DI WATER TO
1000 ml DEGENERATED WITH N₂ T=95°C
N₂ THERMO 0323008

START pH 4.065
END pH 4.953
POTENTIOSTAT EG&G VERSASTAT
DATA NOT SAVED
REFERENCE SCE FISHER 13-620-S1 SN 3106343
E_{corr} -0.446 V KEITHLEY 617
E_{AT} +0.025 V KEITHLEY 617
POST TEST EXAMINATION REVEALED PITS ON
SPECIMEN SURFACE. PLOTS OF POTENTIAL VS
CURRENT DENSITY AND RUN PARAMETERS
ON PAGE 232
DATA COLLECTED WITH EG&G M352 CORROSION
SOFTWARE USING ~~CYCLIC~~ CYCLIC POLARIZATION SETUP
E_{RET} -214mV SCE 7/25/94
E_{RP} -292mV SCE
TEST DATE 4/18/94

Paul D 4/19/94

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.7000	V
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.7000	V
Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	2.000	mV	Step Time	ST	11.98	s
No. of Points	NP	620					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.900	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.4450	V

Quell 4/19/94



Quell 4/19/94

4/21/94

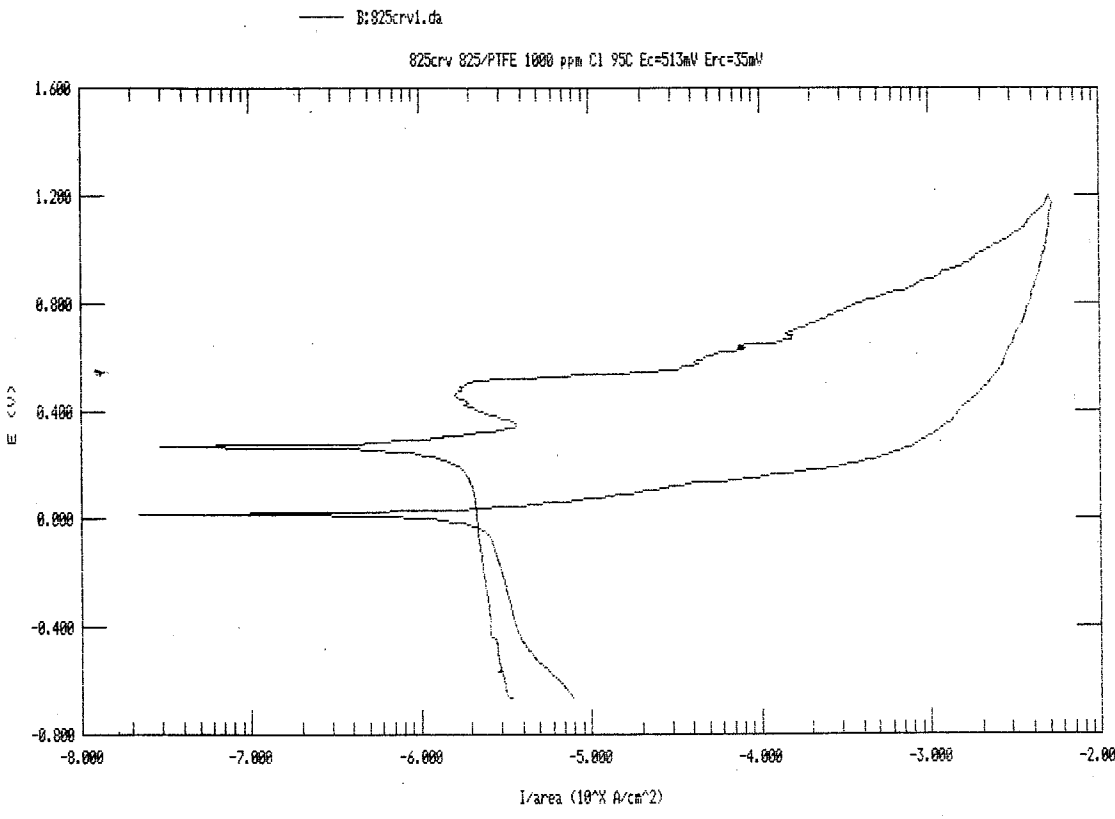
825 CRU1

OBJECTIVE: DETERMINE CREVICE CORROSION INITIATION
AND REPASSIVATION POTENTIALS FOR ALLOY 825
SPECIMEN ALLOY 825 HH4371FC ~~600 grit~~ *DD* 7/25/94
600 GRIT FINISH IMMERSION AREA = 15 cm²
PTFE BLOCKS SECURED TO SPECIMEN FACES WITH
C276 ~~BOLT~~ *DD* BOLT AND NUT TORQUED TO
20 IN OZ. 7/25/94
SOLUTION 1000 PPM Cl⁻ 85 PPM HCO₃ 20 PPM SO₄²⁻
10 PPM NO₃⁻ 2 PPM F⁻ 1000 ml MAKE AS FOLLOWS
1.65177 g NaCl LOT 935535
0.12196 g NaHCO₃ LOT 897789
20 ml SO₄ - 4/94 STARK SOLUTIONS ILM6 085 P98
10 ml NO₃ - 4/94 " "
2 ml F⁻ - 4/94 " "
+ DI WATER TO 1000 ml DEAERATED WITH N₂
T = 95°C N₂ THERMO 0323008
START pH 8.162
END pH 9.403 7/25/94
POTENTIOSTAT ~~EG&G~~ *DD* EG&G VERSASTAT
DATA SAVED AS 825CRU1.DAT
REFERENCE SCE FISHER 13-620-S1 SN 3106343
DD 7/25/94 E_{corr} = -760 mV KEITNEY 617
E_{pit} = -0.266 V KEITNEY 617
POST TEST EXAMINATION REVEALED CREVICE CORROSION
AT POINTS OF CONTACT BETWEEN SPECIMEN AND
PTFE BLOCKS
PLOTS OF POTENTIAL VS CURRENT DENSITY AND
RUN PARAMETERS p.234
SPECIMEN DIMENSIONS p.235
DATA COLLECTED WITH EG&G M352 CORROSION
SOFTWARE USING CYCLIC POLARIZATION SETUP
E_{PIT/CRV} = 513 mV SCE
E_{RP} = 35 mV SCE
TEST DATE 4/21/94

Quell 4/21/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	0.0000	V oc
Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	748					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	15.00	cm^2	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.6670	V

Dund 4/21/94

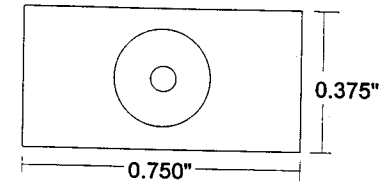


Dund 4/21/94

Darrell S. Dunn
SwRI - CNWRA
Bldg. 57
Ext. 6090

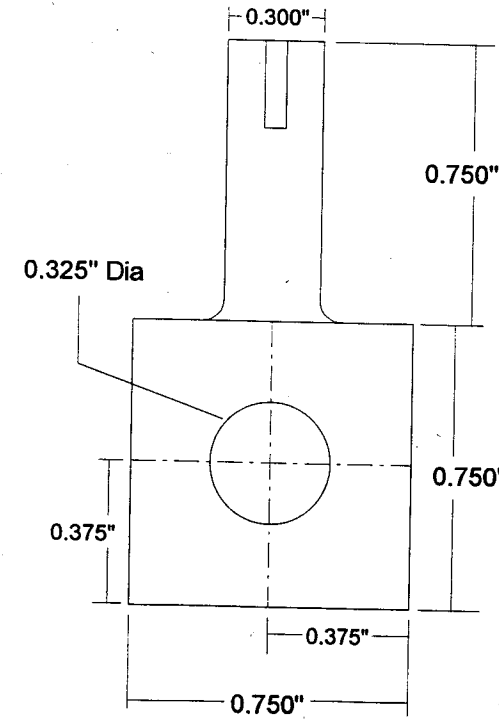
11.5 x 3.0 825
H44371FC

CREVICE REPASSIVATION SPECIMEN
All Dimensions +/- 0.003"



- ALLOY 825
- MACHINE PERPENDICULAR TO ROLLING DIRECTION
- RETURN UNUSED MATERIAL
- REMOVE MIN 1/16" OF MATERIAL FROM SURFACES

#5-40 threads 0.375" deep



Minimum 1/16" radius

Remove Equal Amounts OFF To obtain .875 Thickness

32 Finish all over on this end of part

Dund 4/21/94

4/22/94

825 NOCRV

4/22/94

OBJECTIVE: VERIFY PITTING AND REPASSIVATION
POTENTIALS OF ALLOY 825 SPECIMENS SHOWN ON
PAGE 235

SPECIMEN ALLOT 825 HH4371FG 600 GRIT FINISH
IMMERSED AREA = 15 cm² SPECIMEN DIMENSIONS
SHOWN ON PAGE 235

SOLUTION 1000 ppm Cl⁻ 85 ppm HCO₃⁻ 20 ppm SO₄²⁻

10 ppm NO₃⁻ 2 ppm F⁻ 1000 ml AS FOLLOWS

1.64938 g NaCl LOT 935535

0.11839 g NaHCO₃ LOT 897789

20 ml SO₄-4/94 STOCK SOLUTION TUPERS P98

10 ml NO₃-4/94 " "

2 ml F-4/94 " "

+ DI WATER TO 1000 ml DEAERATED WITH N₂

T=95°C Hg TNGRMD 0323008

START pH 8.206

END pH 9.032

POTENTIOSTAT EG&G VERSASTAT

REFERENCE SCE FISHER 13-620-S1 SN 3106393

E_{corr} -760 mV KEIDNLEY 617

E_{pt} -266 mV " "

POST TEST INSPECTION REVEALED PITS ON

SPECIMEN SURFACE PLOT OF POTENTIAL

VS. CURRENT DENSITY P237

DATA COLLECTED WITH EG&G M352 CORROSION

SOFTWARE USING CYCLIC POLARIZATION SETUP

E_{pt} 635 mV SCE

E_{rp} 117 mV SCE

TEST DATE 4/22/94

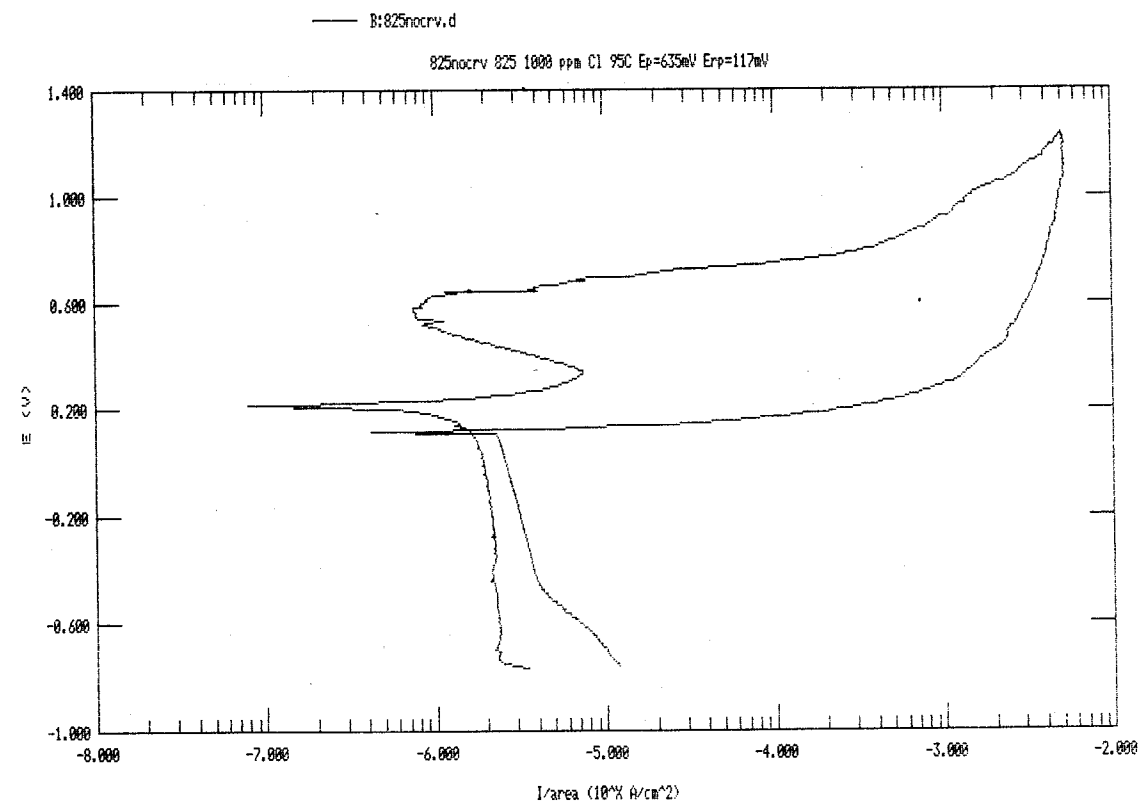
[Signature] 4/22/94

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	798					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	15.00	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.7630	V

[Signature] 4/22/94



[Signature] 4/22/94

Initial Scientific notebook entry for Crevice Repassivation Experiments.

Title: Crevice Repassivation

Tests Performed by: Darrell S. Dunn and Narasi Sridhar

Objectives: Determine the repassivation potential for crevice corrosion as a function of bulk environment, material, extent of corrosion.

Equipment: EG&G Versastat Serial Number 20104. EG&G model 352 corrosion software. Compaq 386/20 computer. ESC multichannel potentiostat Serial Number 9209138. Strawberry tree data acquisition boards (16 channel, 16 bit A/D and 8 channel, 12 bit D/A) and workbench data acquisition software. Compuadd 586 computer. ASTM G-5 polarization cell, Teflon/glass reaction vessels or vessel meeting the requirements of TOP-008

Materials: Alloy 825 HH4371FG, 316L P80746.

Specimen specifications: As shown in IWPE-045 page 235

Measurement Parameters: As described in TOP-008

Required level of accuracy: Potentials \pm 5mV

Uncertainty and Sources of Error: Current density calculated as current divided by sample area. Actual current density of corroding areas is not determined.

[Signature] 5/5/94

COMPARISON OF E_p & E_{RP} DATA FROM 825CRU1
AND 825NOCRU TESTS:

	WITH CREVICE 825CRU1	WITHOUT CREVICE 825NOCRU
E_p	513mV _{SCE}	635mV _{SCE}
E_{RP}	35mV _{SCE}	117mV _{SCE}

CONCLUSION: CREVICE CORROSION INITIATED AT LOWER
POTENTIALS. CREVICE CORROSION REPASSIVATION AT
LOWER POTENTIALS THAN PITTING REPASSIVATION

[Signature] 5/5/94

5/27/94

CYCLIC POLARIZATION 316L62m

OBJECTIVE DETERMINE E_p AND E_{RP} IN 6.2 MOLAL
NaCl $\frac{1}{25}$ M
SPECIMEN ~~AL 825~~ 5/27/94 316L P80746 600SiC FINISH
 $d = 1.914$ $d = 0.247$ STARTWT = 11.4459g
SOLUTION 6.2 MOLAL NaCl MADE BY ADDING
366.6 g NaCl TO 1000 ml DI WATER
NaCl LOT # 935535 DEAERATED WITH N_2
FROM LIQUID CARBONIC TANK # 254116
T = 95°C N_2 TMRMB 0323004
START pH 6.633
END pH 7.302
POTENTIOSTAT EG&G VERSASTAT # 20104
REFERENCE SCE FISHER 13-620-S1 SN 3106321
 E_{CORR} -631 mV KEITHLEY 614 # 555368
 E_{PT} +196 mV " "
POST TEST INSPECTION REVEALED PITS ON
SPECIMEN SURFACE DATA SAVED AS 316L62m.DAT
USING EG&G M352C SOFTWARE
PLOT OF POTENTIAL VS CURRENT DENSITY P240
 E_{PET} = -239 mV
 E_{RP} = -464 mV
TEST DATE 5/27/94
END WT 11.39159g

[Signature] 5/30/94

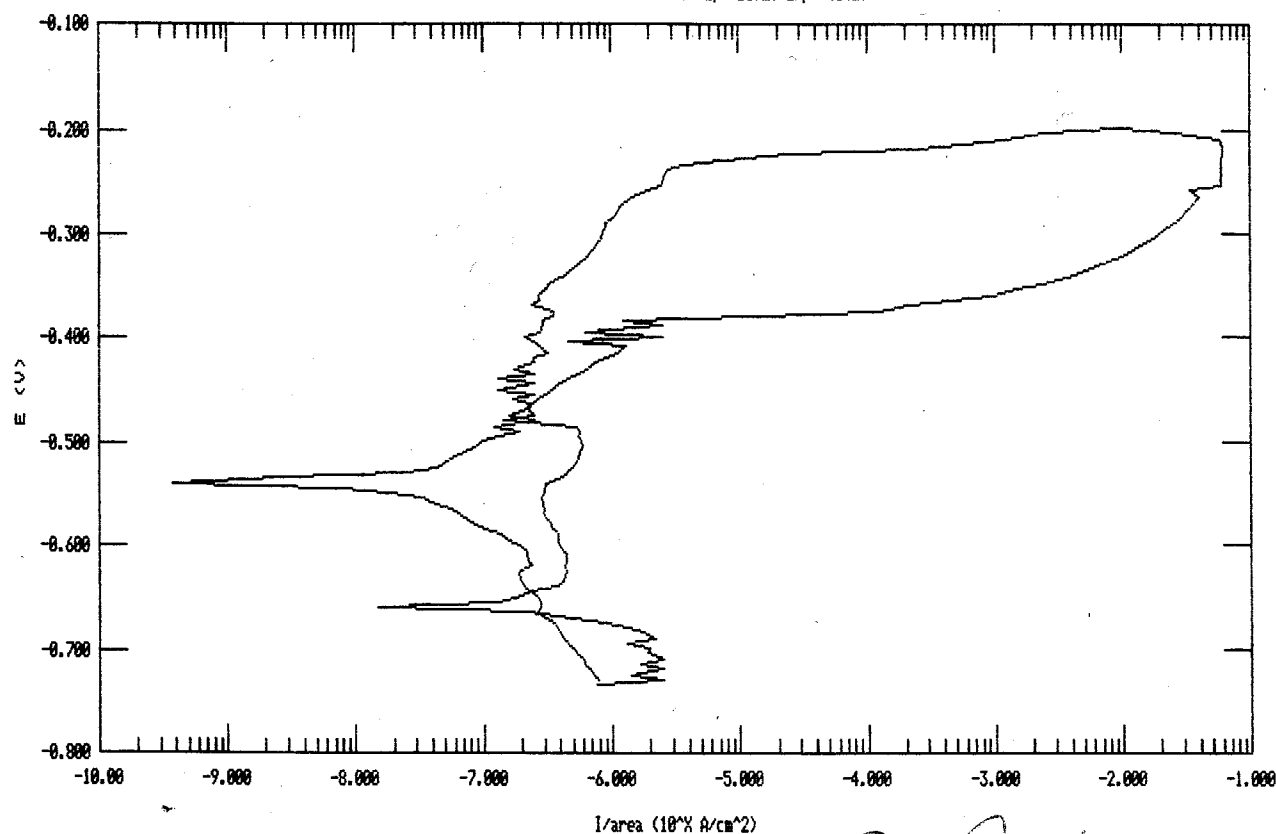
5/30/94

Model 352/252 Corrosion Analysis Software, v. 2.01
 File Status: NORMAL Date Run: 05-27-94 Time Run: 16:08:34
 CP PASS vs. R CT PASS IP -0.100 vs. OC
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 ID 60 S
 FL NONE RT HIGH STABILITY REF 0.24150 SCE CR AUTO V1 0.820 vs. OC FP -0.100 vs. OC
 IT 4.000E-02 ITR 8.000E+00 EM 0.000E+00 DEN 7.800E+00 AR 8.000E+00 IR NONE LS NO

Filename: B:31L62M Pstat: VStat[] Ver 2 CP CYCLIC POLARIZATION
 ID 60 S V1 0.820 vs. OC FP -0.100 vs. OC
 CR AUTO NP 214 IR NONE
 WRK SOLID AR 8.000E+00 LS NO
 DEN 7.800E+00 OC -0.634

B:31L62M

31L62M 316L 6.2 Molal NaCl Ep=-239mV Erp=-464mV



Revised 5/30/94

Model 352/252 Corrosion Analysis Software, v. 2.01
 Filename: B:31L62M
 Pstat: VStat[] Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 05-27-94

File Status: NORMAL
 Time Run: 16:08:34

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	214					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm^2	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.6340	V

Revised 5/30/94

5/30/94

CYCLIC POLARIZATION

DD 5/30/94
~~8253~~

82562.MCI

OBJECTIVE DETERMINE E_p AND E_{RP} OF ALLOY
 825 IN 6.2 MOLAL NaCl

SPECIMEN ALLOY 825 NH4371FC $L = 1.914$ $d = 0.245$

START WT 11.7586g

END WT 11.66550g

600 SiC FINISH

SOLUTION 6.2 MOLAL NaCl AS DESCRIBED ON PAGE 239

DEAERATED WITH N_2 FROM LIQUID CARBONIC

TANK # 254116

$T = 95^\circ C$ H_2 TNGRMD # 0323004

START pH 6.633

END pH 7.677

POTENTIALSTAT EG&G VERSASTAT # 20104

REFERENCE SCG FISHER 13-620-SI SN 3106321

$E_{CORR} = -613 mV$

$E_{PT} = +255 mV$

POST TEST INSPECTION REVEALED PITS ON

SPECIMEN SURFACE DATA SAVED AS 82562.MCI.DAT

USING EG&G M352 SOFTWARE

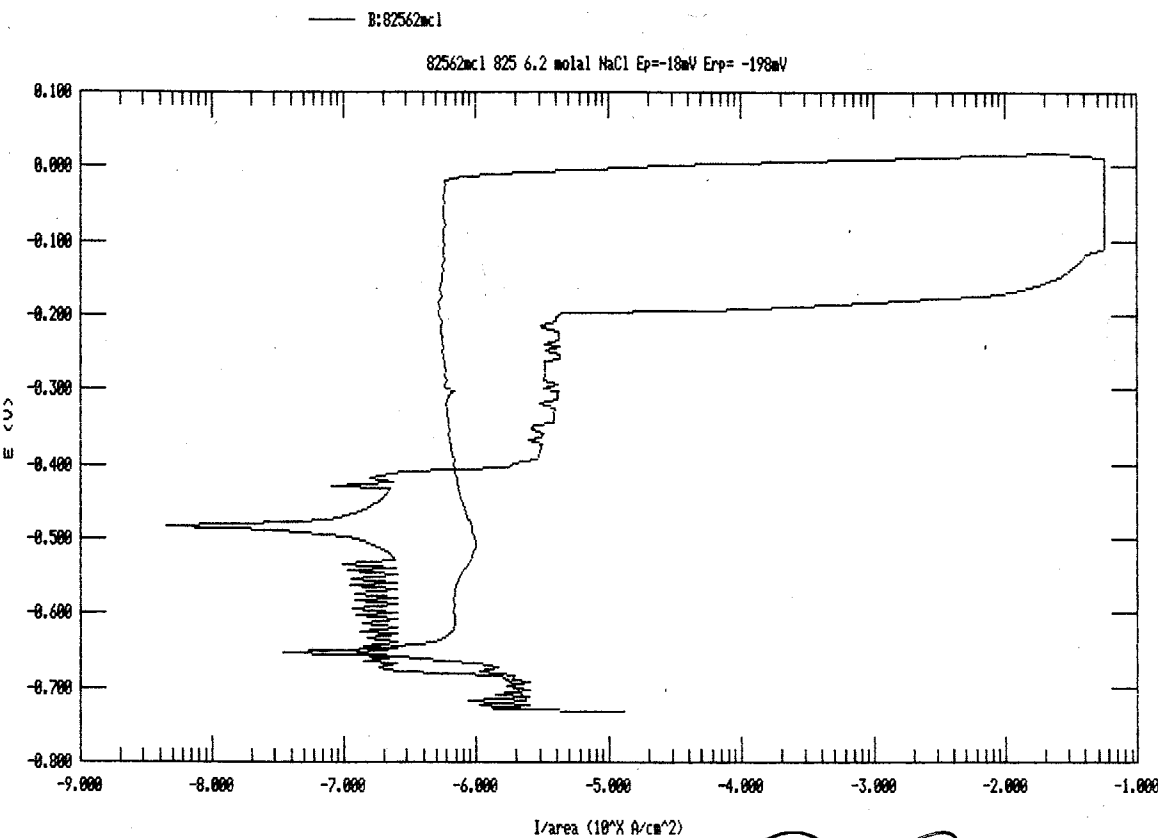
PLOT OF POTENTIAL VS CURRENT DENSITY p242

$E_{PT} = -18 mV$

$E_{RP} = -198 mV$

Revised 5/31/94

Model 352/252 Corrosion Analysis Software, v. 2.01
File Status: NORMAL Date Run: 05-29-94 Time Run: 17:50:56
CP PASS vs. R CT PASS IP -0.100 vs. OC ID 60 S V1 0.020 vs. OC FP -0.100 vs. OC
SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO NP 300 IR NONE
FL NONE RT HIGH STABILITY REF 0.24150 SCE WPK SOLID AR 8.000E+00 LS NO
IT 4.000E-02 ITA 8.000E+00 EM 0.000E+00 DEN 7.000E+00 OC -0.633



Good 5/31/94

Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: B:82562mcl
Pstat: VStat[] Ver 2
CP CYCLIC POLARIZATION
Date Run: 05-29-94
File Status: NORMAL
Time Run: 17:50:56

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	300					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm^2	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.6330	V

Good 5/31/94

6/2/94

825Cr20B

Cyclic Polarization Curve for 20% Cold Rolled 825, 600-Grit Finish.

Objective: To determine pit initiation and repassivation potential of 825 cold rolled 20% and polished to 600-grit finish.

Specimen: Alloy 825, 20% cold-rolled at Inco, HH4371FG-20CR
Rectangular specimen same as on p. 221, but polished on all surfaces to 600-grit.
Immersed Area:

Solution: Composition same as p. 221
NaCl Lot No.: 935535
NaH₂PO₃ Lot No.: 897789
Na₂SO₄ Lot No.: 5 Stock solution 5/94, IWPE 085, p. 83
Na₂NO₃: Stock solution 5/94, IWPE 085, p. 82-83
NaF: Stock solution 5/94, IWPE 085, p. 82-83

+ DI Water. Purged with N₂.

Temp: 95°C, Hg Thermometer 0323004
Start pH: 8.296
End pH: 10.033

Potentiostat: Versastat EG&G, SN: 20104
Reference Electrode: SCE, SN: D169033, Fisher Model: 15-620-51
Initial Potentials: Working Electrode: -0.595 (Keithley 614, SN: 555365)
Counter Electrode (Pt): -0.230 (" " ")

Final corr. Pot.: Sample: -0.4023 (V. SCE as above)
Corr. Pot: Pt: -0.565 (V. SCE ")

Sample dimensions: length: 1.6 in; width: 0.5 in Thickness: 0.228 in
Immersed Area: 15.74 cm²

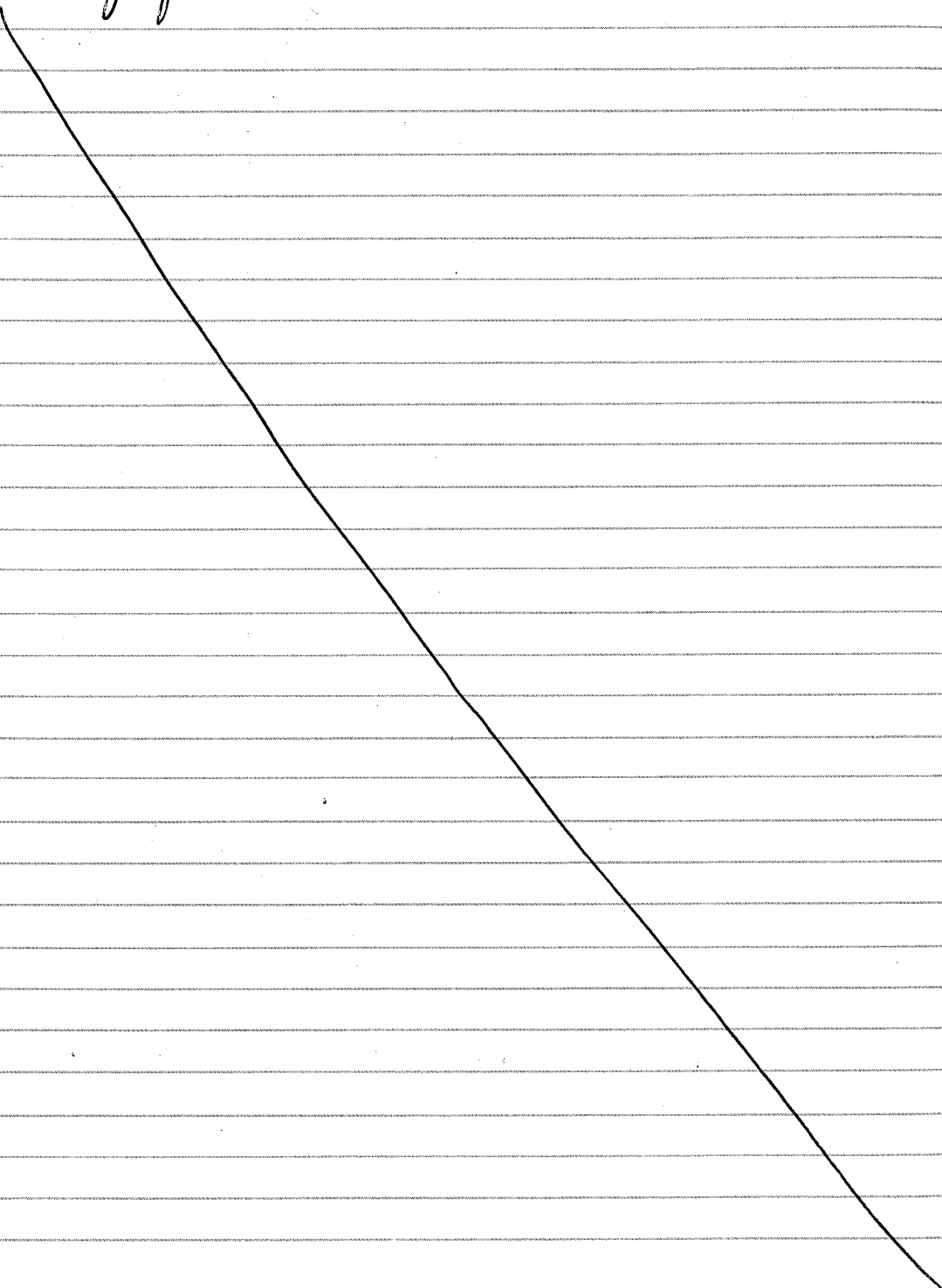
E_p = 0.6700 V SCE
E_{rp} = -0.005 V SCE

POST TEST on Specimen Revealed Pits.

Good 6/3/94

Graph of Potential vs. current Density And run parameters
on Page 244 245 gm 6/3/94
Data collected with E6 & G m 352 Corrosion software
using cyclic polarization setup

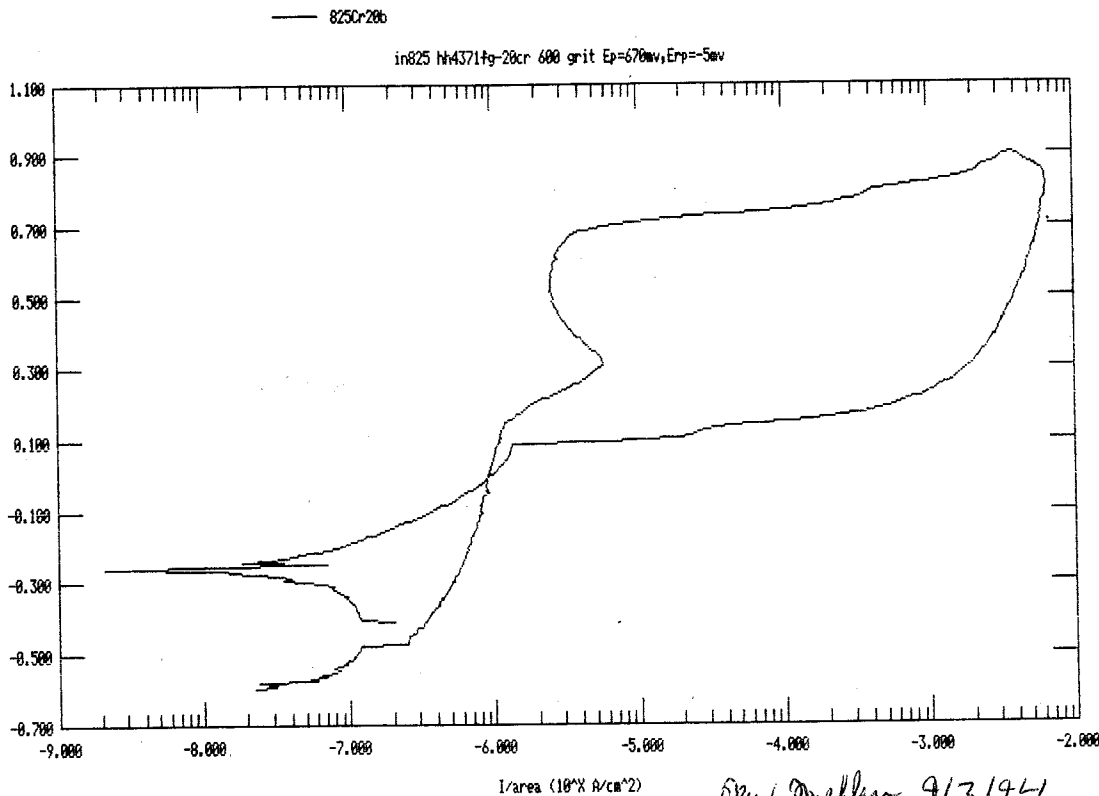
gung mellen 6/3/94



Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION
SI 5.000E-03 CT PASS IP 0.000 vs. OC
FL NONE SR 1.669E-04 ST 2.995E+01 CR AUTO
IT 7.870E-02 RT HIGH STABILITY REF 0.24150 SCE
Comment: Specimen ID: 825Cr20B Date: 6/3/94

Filename: .\data\825Cr20b
Date Run: 06-02-94 Time Run: 08:53:44
V1 0.820 vs. OC
AR 1.574E+01
OC -0.595

Pstat: VStat() Ver 2
FP 0.000 vs. OC
IR NONE
LS NO



gung mellen 9/3/94

Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: .\data\825Cr20b
Pstat: VStat() Ver 2
CP CYCLIC POLARIZATION
Date Run: 06-02-94 Time Run: 08:53:44

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	0.0000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	562					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	15.74	cm^2	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.5950	V

Comment: Specimen ID: 825Cr20B Date: 6/3/94 gung mellen 9/3/94

Cyclic polarization curve for 825, 600 Grit Finish.

Object: To determine pitting initiation and repassivation potentials of 825 polished to 600 grit finish.

Specimen: Alloy 825 HH4371FG
Cylindrical sample polished on all surfaces to 600 grit.
Immersed area:Solution: 6.2 mols Cl/kg water
 LiCl Lot No. 930844 No. Grams 183.97
1M HCl 0.02 g/ml HCl 4.54 ml 37% HCl Lot F10511290
Prepared 5/3/94.+ DI water purified with N_2 Temp: Hg thermometer 0323004

Start pH: 8.483

End pH: 7.239

Sample dimensions: Size: Width: .249 in.
Length: 1.85 in.Potentialstat: Versastat EG & G SN 20104
Reference electrode: SCE SN: 3106321Initial potentials: Working electrode: $-0.4944 \text{ V}(\text{SCE})$
Counter electrode (Pt): 0.2655 V (Kalmig 614 SN: 55538)Final Corr. Pot. : Sample: Initial weight: 11.85143 g
 Corr. Pot. : Pt: Final weight: 11.80009 g E_p : -0.1320 V E_{rp} : -0.2470 V

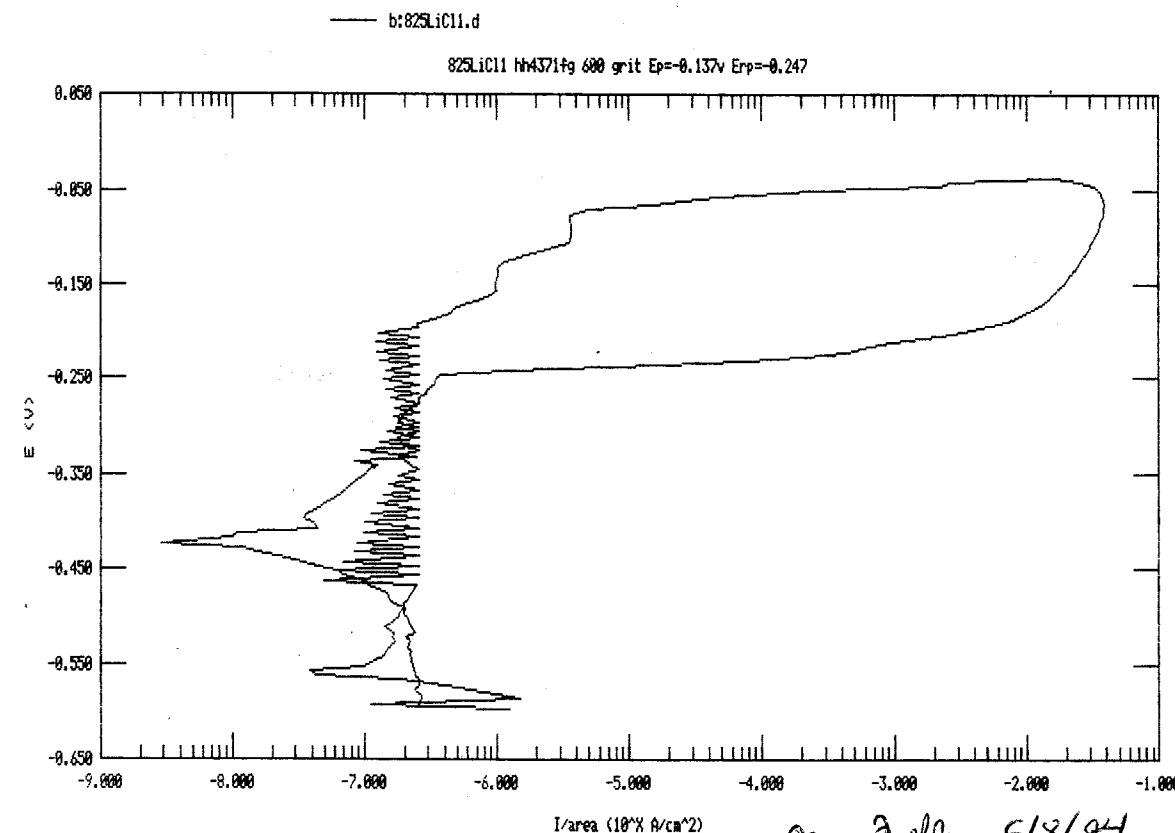
Post test examination revealed pits

Data collected with EG & G Model 352 Corrosion software using
cyclic polarization set up

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION
CP PASS vs. R CT PASS
SI $5.000\text{E}-03$ SR $1.669\text{E}-04$
FL NONE RT HIGH STABILITY REF 0.2415 V SCE
IT $4.000\text{E}-02$ ITA $8.000\text{E}+00$ EW $0.000\text{E}+00$

Filename: b:825LiCl1.dat
File Status: NORMAL
Date Run: 06-03-94
Time Run: 16:48:58
ID 60 S
VI 0.020 V vs. OC
CR AUTO
NP 224
AR $8.000\text{E}+00$
OC -0.497

Pstat: VStat[] Ver 2
FP -0.100 V vs. OC
IR NONE
LS NO



Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: b:825LiCl1.dat
Pstat: VStat[] Ver 2
CP CYCLIC POLARIZATION
Date Run: 06-03-94
Time Run: 16:48:58

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	$20.00\text{E}-3$	V oc
Initial Delay	ID	60	s	I Threshold	IT	$5.000\text{E}-3$	A/cm ²
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	224					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415 V	
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.4970	V

Jerry Melman 6/8/94

6/5/94

825 300 CI

OBJECTIVE DETERMINING E_p AND E_{RP} OF ALLOY825 IN 300 PPM Cl^-

SPECIMEN ALLOY 825 NN4371FG 600 S/C FINISH

 $L = 1.913$ $d = 0.246$

START WT: 11.79090 g

END WT: 11.78043 g

SOLUTION 300 PPM Cl^- 85 PPM HCO_3^- 1000 PPM SO_4^{2-} 1000 PPM NO_3^- 2 PPM F^- 1000 ml MAKE AS FOLLOWS

0.49484 g NaCl LOT 935535

1.37512 g $NaNO_3$ LOT 901213 6/14/94 8971831.47394 g Na_2SO_4 LOT 9012130.11808 g $NaHCO_3$ LOT 8977892 ml F^- 6/94 STOCK SOLUTION IWA 085 p147

+ DI WATER TO 1000 ml DEAERATED WITH

99.999% N_2 LIQUID CARBONIC TANK 254116 $T = 95^\circ C$ N_2 THERMO 0323004

START pH 8.198

END pH 8.885

POTENTIOSTAT EG&G VERSASTAR # 20104

REFERENCE SCE FISHER 13-620-51 SN 3106321

 $E_{CORR} = -679$ $E_p = -108$

MANY SMALL PITS VISIBLE ON SPECIMEN

SURFACE. RUN PARAMETERS AND PLOT

P. 249

[Signature]
6/14/94

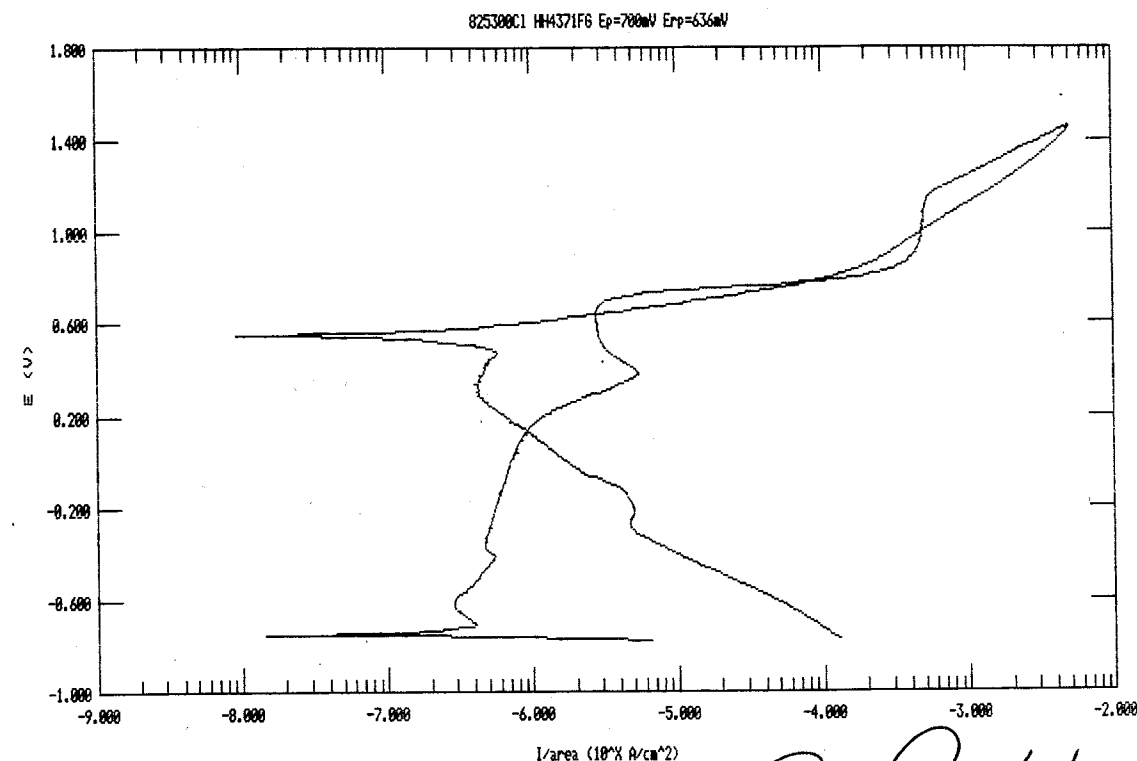
Model 352/252 Corrosion Analysis Software, v. 2.01

File Status: NORMAL Date Run: 06-05-94 Time Run: 19:46:16
 CP PASS vs. R CT PASS IP -0.100 vs. OC
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO
 FL NONE RT HIGH STABILITY REF 0.24150 SCE WKS SOLID
 IT 4.000E-02 ITR 8.000E+00 EN 0.000E+00 DEN 7.000E+00

Filename:

Pstat: VStat() Ver 2 CP CYCLIC POLARIZATION

V1 0.020 vs. OC FP -0.100 vs. OC
 NP 896 IR NONE
 AR 8.000E+00 LS NO
 OC -0.679



[Signature] 6/14/94

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename:

Pstat: VStat() Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 06-05-94

File Status: NORMAL
 Time Run: 19:46:16

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	s
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	
No. of Points	NP	896					

Line Sync.	LS	no	GI Time Const.	TC	Off
Rise Time	RT	high stability	IR Mode	IR	none
Working Elec.	WE	Solid	Filter	FL	Off
Sample Area	AR	8.000	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	7.800	Equiv. Mt.	EW	0.0000 g
			Open Circuit	OC	-0.6790 V

[Signature] 6/14/94

825 LiCl2

OBJECTIVE DETERMINE E_p & E_{RP} OF ALLOY
825 IN CONCENTRATED LiCl

SPECIMEN ALLOY 825 HH4371FG 600 S.C

$R_s = 1.914$ $d = 0.247$

START WT. 11.91495g

END WT 11.86421g

SOLUTION 9.0 MOL% Cl / kg WATER AS LiCl

286 g LiCl LOT 930844 + 750 ml DI WATER

SOLUTION ADJUSTED TO pH 4.0 BY THE

ADDITION OF HCl

START pH = 4.02

END pH = 5.76

$T = 95^\circ\text{C}$ N₂ THROUGH 0323004

SOLUTION DEAERATED OVERNIGHT WITH N₂

FROM LIQUID CARBONIC TANK # TT 45520

POTENTIOSTAT EG&G VERSASTAT # Z0104

REFERENCE SCE FISHER 13-620-S1 SN 3106321

$E_{CORR} = -351\text{ mV}$ KEITHLEY 614 # 555368

$E_{PT} = +290\text{ mV}$

RUN PARAMETERS AND PLOT p251

$E_p = -109\text{ mV}$

$E_{RP} = \text{APPROX } -340\text{ mV}$

SOME SMALL PITS AND UNIFORM CORROSION

Pt POTENTIAL AFTER SOLUTION COOLED

TO ROOM TEMP AND NO SOLUTION

DEGENERATION

WITH LUGGIN PROBE -0.085 V

WITH SCE DIRECTLY -0.087 V

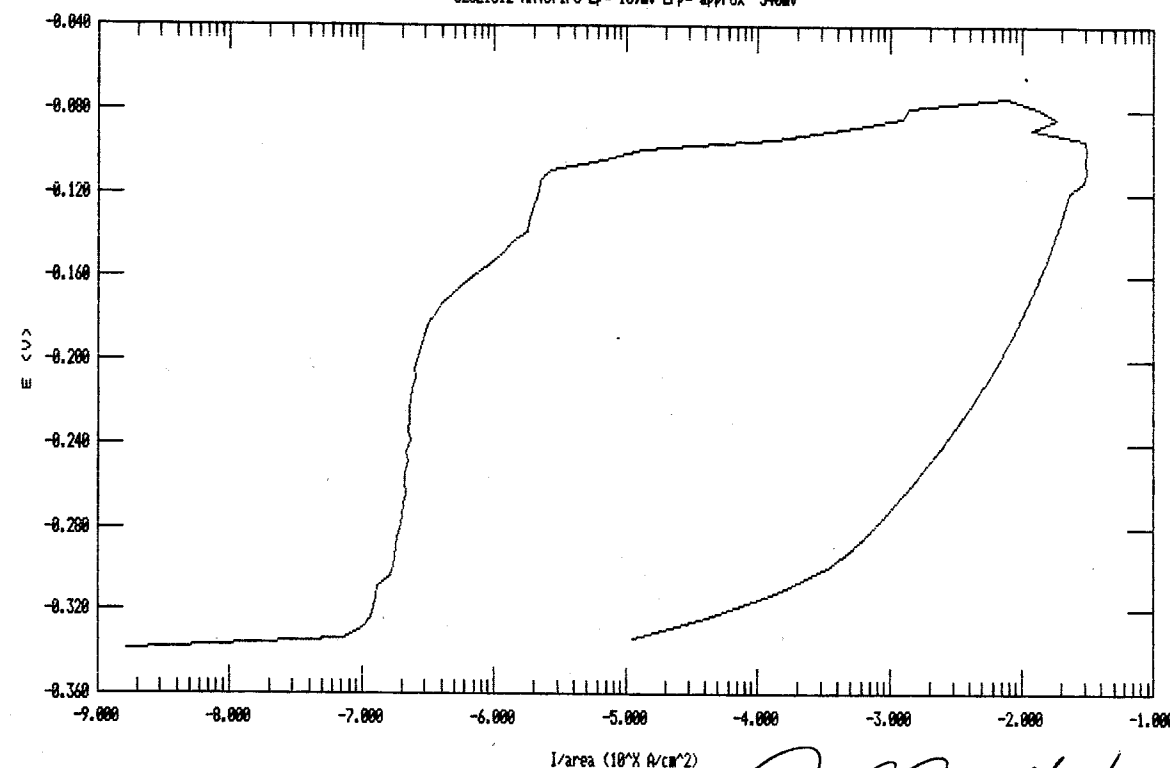
[Signature] 6/17/94

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION
SI 5.000E-03 CT PASS IP 0.000 vs. OC
FL NONE SR 1.669E-04 ST 2.995E+01 CR AUTO
IT 7.500E-02 RT HIGH STABILITY REF 0.24150 SCE WRK SOLID
ITA 1.500E+01 EN 0.000E+00 DEN 7.800E+00 AR 1.500E+01
OC -0.339

Filename: B:825LiCl2.dat
Date Run: 06-07-94 Time Run: 12:43:21
Pstat: VStat[] Ver 2

B:825LiCl2.d

825LiCl2 HH4371FG $E_p = -109\text{ mV}$ $E_{RP} = \text{approx } -340\text{ mV}$



I/area (10⁻⁴ A/cm²)

[Signature] 6/17/94

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: B:825LiCl2.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 06-07-94

File Status: NORMAL

Time Run: 12:43:21

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	106					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	15.00	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.3390	V

[Signature] 6/17/94

316L C105

OBJECTIVE DETERMINE E_p AND E_{RP} OF 316L
IN ~~TOO~~ DD 9/6/94 0.5 Molar Cl WITH
EXPOSED CREVICE.

SPECIMEN 316L P80746 600 S;C FINISH
 $\lambda = 1.913$ $d = 0.248$

START WT = 11.54162g

END WT = 11.52283g

SOLUTION 0.5 Molar Cl⁻ AS NaCl

800 ml OF STOCK SOLUTION PREPARED WITH
58.43614g NaCl + DI WATER TO 2000 ml

START pH 5.850

END pH 10.548

TEMPERATURE = 24°C H₇ THERMOMETER 032300P

CALIBRATION DUG 21 MAR 95

POTENTIOSTAT EG & G 273 SN ~~4118~~ DD 9/6/94 41108

REFERENCE Ag/AgCl FISHER 13-620-53 SN 8118182

$E_{CORR} = -94$ mV KEITNLEY 614 SN 555368

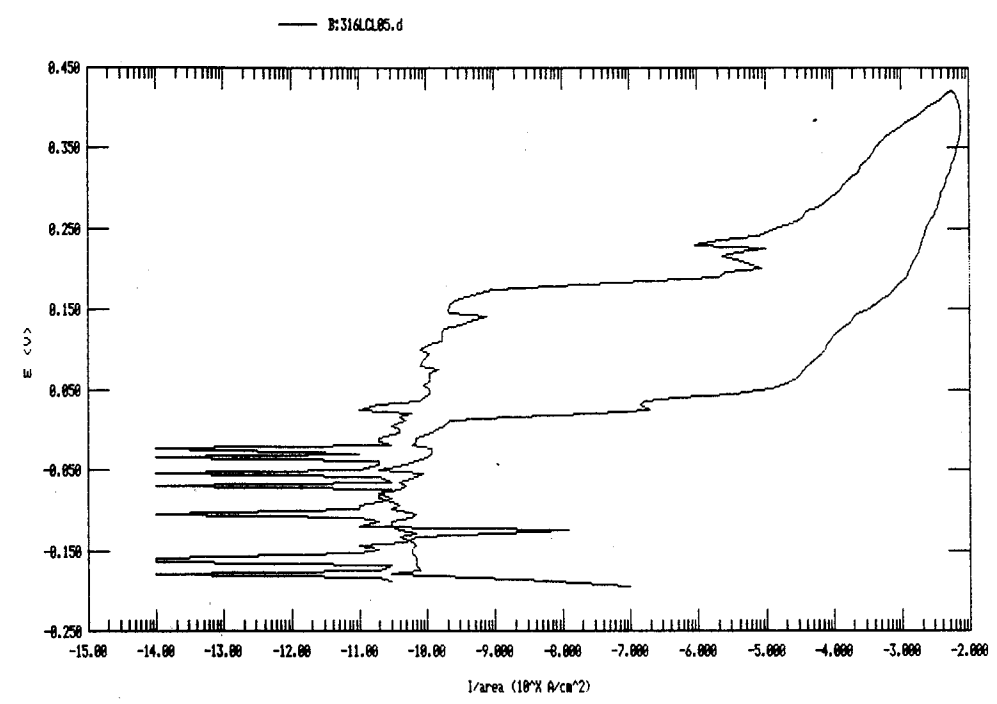
$E_p = +524$ mV KEITNLEY 614 SN 555368

RUN PARAMETERS AND PLOT p 253

[Signature]

9/6/94

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION File Status: NORMAL Date Run: 09-06-94 Time Run: 02:12:03 Pstat: M273 [1] Ver 19
CP PASS vs. R CT PASS IP -0.100 vs. OC ID 60 S VI 0.020 vs. OC FP -0.100 vs. OC
SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO HP 246 IR NONE
FL NONE RT HIGH STABILITY REF 0.19700 AgCl WPK SOLID AR 1.000E+01 LS NO
IT 5.000E-02 ITA 1.000E+01 EN 0.000E+00 DEN 0.000E+00 OC -0.094



[Signature] 9/6/94

Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: B:316LCL05.dat
Pstat: M273 [1] Ver 19
CP CYCLIC POLARIZATION File Status: NORMAL
Date Run: 09-06-94 Time Run: 02:12:03

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	246					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	10.00	cm^2	Ref. Elec.	RE	AgCl 0.1970 V	
Density	DE	8.000	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-94.00E-3	V

[Signature] 9/6/94

[Signature] 9/6/94

316 C106

OBJECTIVE DETERMINING E_p AND E_{Rp} IN
9.1 MCLAL LiCl AT PH 4 AT 95°C
SPECIMEN 316L P80746 600 S.C
L₂ 1.913 d=0.246
START WT. 11.51228g
SOLUTION 800ml OF SOLUTION PREPARED
BY ADDING 578.6 g LiCl LOT 941585
TO 1500ml DI WATER AND ADJUSTED
TO PH ≈ 4.0 BY THE ADDITION OF HCl
LOT FLO51290
START pH 3.85
TEMPERATURE 95°C Na THERMOMETER 0323007
CALIBRATION DUE 21 MARCH '95
POTENTIOSTAT EG&G VERSASTAT SN 20104
REFERENCE SCE FISHER 13-620-SI SN 3106339
 E_{corr} -534mV KEITHLEY 614 SN 555368
 E_{Pt} -178mV KEITHLEY 614 SN 555368
RUN PARAMETERS AND PLOT P255.
CURRENT DURING CONDITION AT -935mV/SCE = 2 mA
END WT 11.47938g
SPECIMEN HAS LARGE REGIONS OF
LOCALIZED ATTACK.
END PN 6.16

[Signature]
10/27/94

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: B:316LCL06.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 10-25-94

File Status: NORMAL

Time Run: 17:03:07

Cond. Time	CT	1200	s	Initial Pot.	IP	-0.4000	V oc
Cond. Pot.	CP	-0.4000	V oc	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	pass	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.4000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	394					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.8120	V

Model 352/252 Corrosion Analysis Software, v. 2.01

CP CYCLIC POLARIZATION

CP -0.400 vs. OC CP -0.935 vs. R

FP -0.400 vs. OC SI 5.000E-03

IR NONE FL NONE

IT 4.000E-02 ITA 0.000E+00

File Status: NORMAL

Date Run: 10-25-94

IP -0.400 vs. OC

ST 2.995E+01

RT HIGH STABILITY

EW 0.000E+00

Filename: B:316LCL06.dat

Date Run: 10-25-94

Time Run: 17:03:07

ID PASS

CR AUTO

REF 0.24150 SCE

WPK SOLID

OC -0.812

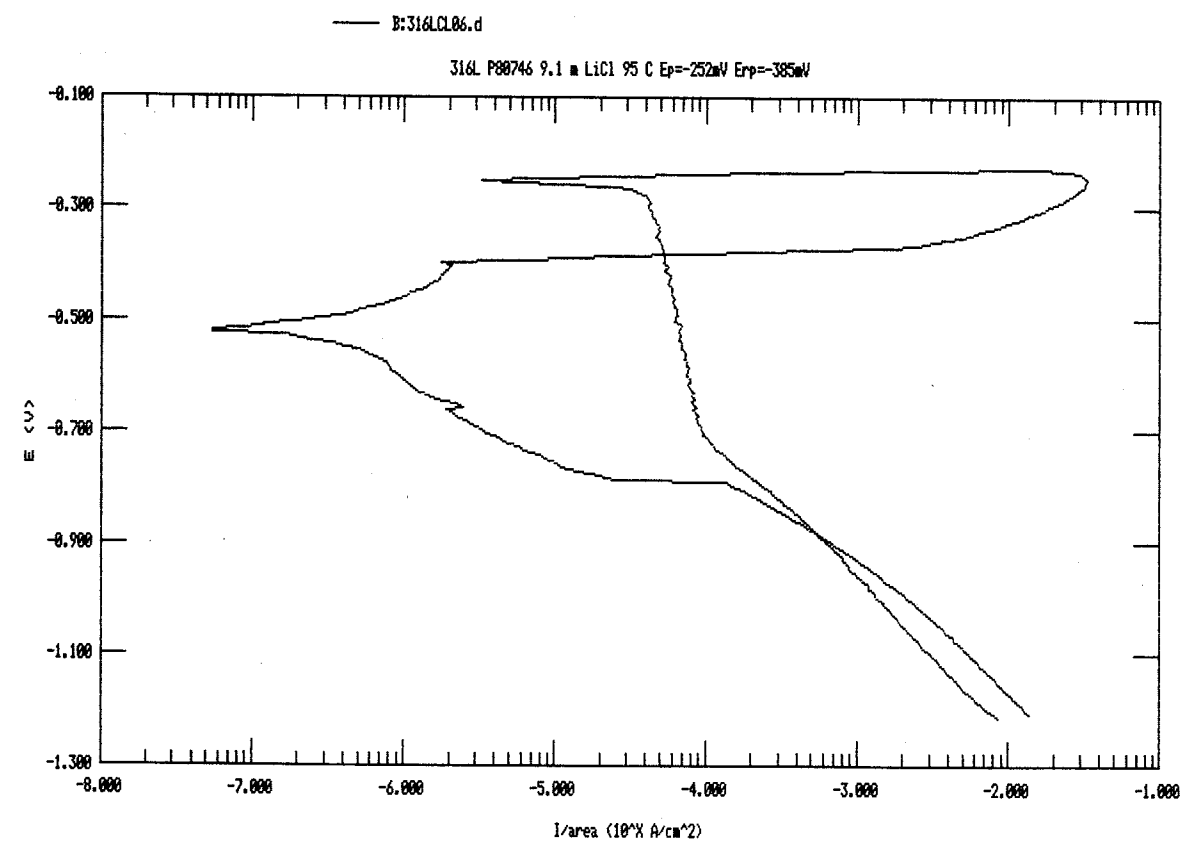
Pstat: VStat[] Ver 2

V1 0.020 vs. OC

NP 394

AR 0.000E+00

LS NO



Pages 1 through 255 of this Scientific Notebook were reviewed for compliance with QAP-001 in response to Corrective Action Request 94-02. Corrections and clarifications were made as appropriate. In some cases, the date of a change will reflect the date of this review rather than the date of the original Scientific Notebook entry.

Randy Folch
SURE - CA
11/28/94

316LTS1

OBJECTIVE DETERMINE E_p AND E_{RP} OF 316L
IN 1000 PPM Cl^- + $10^{-2} M S_2O_3^{2-}$
SPECIMEN 316L P80746 600 S.C FINISH
 $L = 1.915$ $d = 0.246$
START WT = 11.62117g
END WT = 11.53701g
SOLUTION 1000 PPM Cl^- + 10^{-2} MOLAR $S_2O_3^{2-}$
1000 ml MADE AS FOLLOWS (DETERMINED W/ N_2 # TT 45520)
1.65025 g NaCl LOT 935535
1.58078 g $Na_2S_2O_3$ LOT 923931A
0.21 ml of 0.02g/ml NaCl LOT FLO51290
START pH = 4.009
END pH 8.221
TEMPERATURE 95°C N_2 THERMOMETER 0323004
CALIBRATION DUE 21 MAR '95
POTENTIOSTAT: EG&G VERSASTAT SN 20104
REFERENCE JCG FISHER 13-620-S1 SN 0165403
 E_{CORR} -239mV REITNLEY 614 #467374
 E_{PT} -181mV REITNLEY 614 #467374
RUN PARAMETERS AND PLOT P 258
 $E_p = 200mV$
 $E_{RP} = -315mV$
MANY PITS VISABLE ON SPECIMEN SURFACE
DATA SAVED AS 316LTS1.DAT

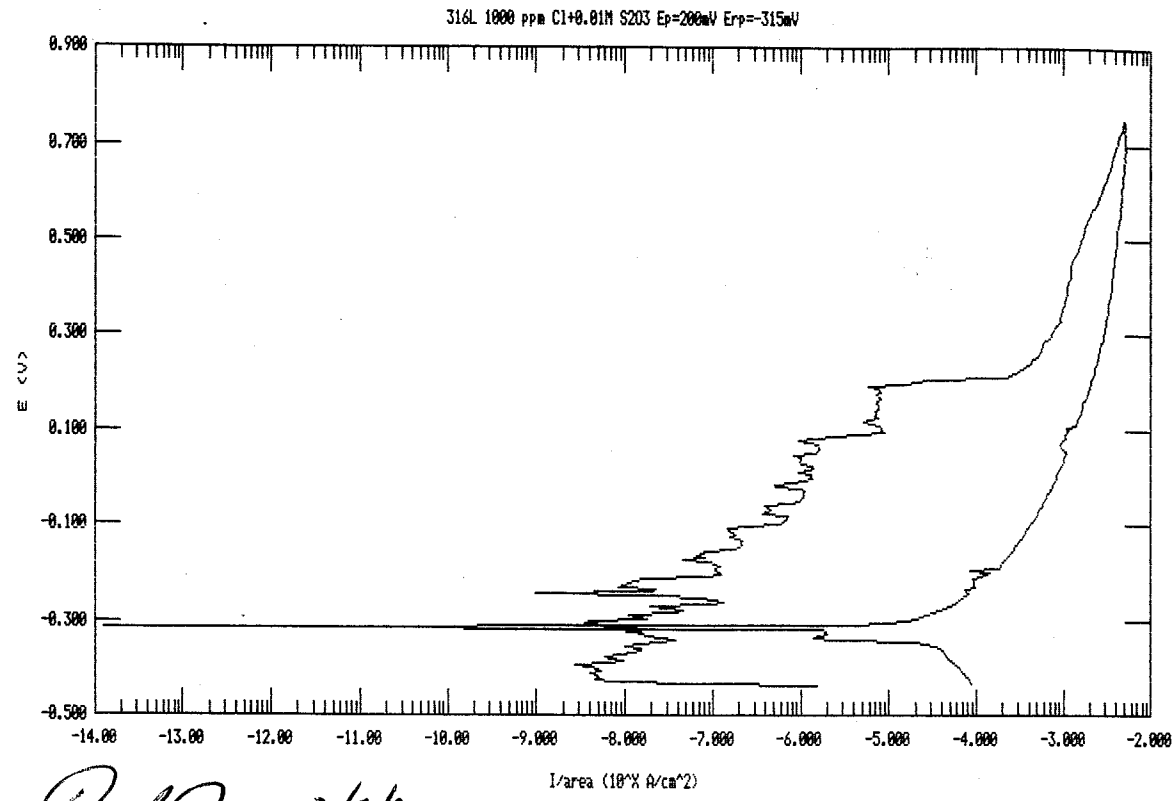
Paul D 12/8/94

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION
CP PASS vs. R CT PASS
SI 5.000E-03 SR 1.669E-04
FL NONE RT HIGH STABILITY
IT 4.000E-02 ITA 8.000E+00

Filename: B:316LTS1.dat
File Status: NORMAL
Date Run: 11-18-94
Time Run: 16:59:17
IP -0.200 vs. OC
ID 30 S
ST 2.995E+01
CR AUTO
MRK SOLID
AR 8.000E+00
DEN 7.800E+00
OC -0.240

Pstat: VStat[] Ver 2
V1 0.820 vs. OC
NP 476
IR NONE
LS NO
FP -0.200 vs. OC

B:316LTS1.da



David D 12/8/94

Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: B:316LTS1.dat
Pstat: VStat[] Ver 2
CP CYCLIC POLARIZATION
Date Run: 11-18-94

File Status: NORMAL
Time Run: 16:59:17

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	30	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	476					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm^2	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.2400	V

David D 12/8/94

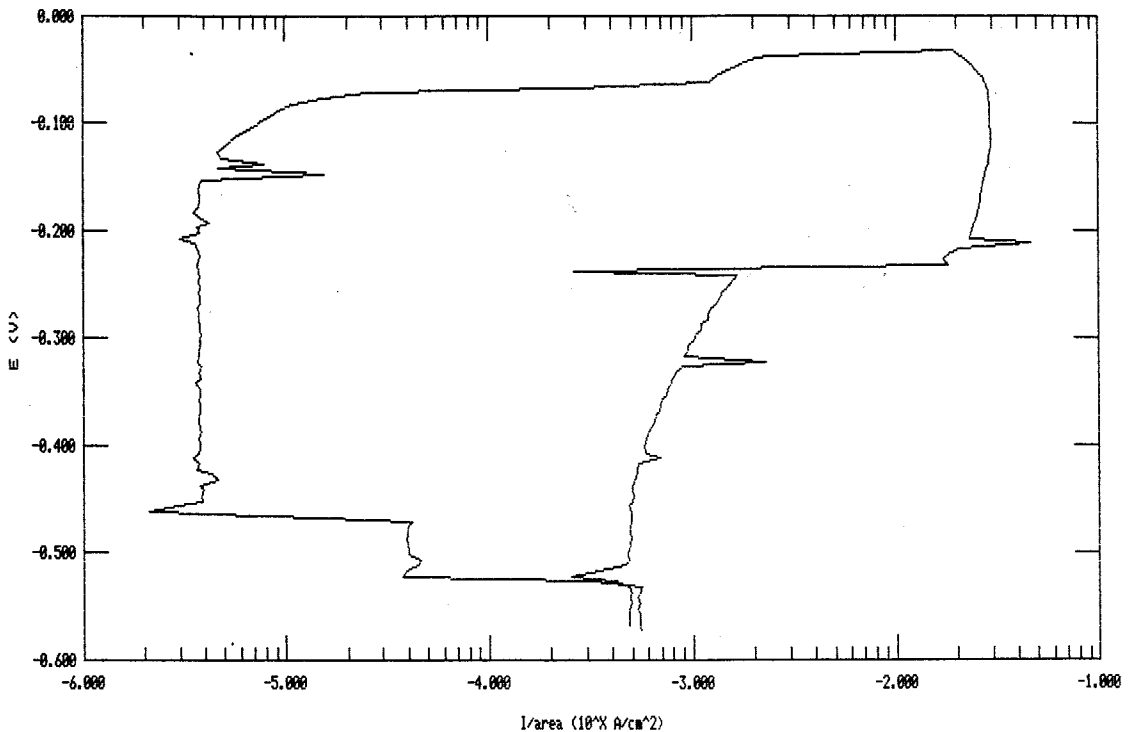
316L TS2

OBJECTIVE DETERMINE E_p AND E_{RP} IN
1 Molar Cl^- + 10^{-2} Molar $S_2O_3^{2-}$
SPECIMEN 316L P80746 600 S.C FINISH
 $d = 1.915$ $d_z = 0.1247$
START WT 11.55435 g
END WT 11.44764 g
SOLUTION 1 Molar Cl^- + 10^{-2} Molar $S_2O_3^{2-}$
1000 ml MARK AS FOLLOWS (DEGASSED w N_2)
58.44220 g NaCl LOT 935535
1.58820 g $Na_2S_2O_3$ LOT 923931A
0.22 ml 0.02 g/ml HCl LOT FC051290
START pH = 4.015
END pH = 8.575
TEMPERATURE = 95°C N_2 THERMOMETER 0323004
CALIBRATION DUG 21 MAR 95
POTENTIOSTAT EG&G VERSASTAT SN 20104
REFERENCE SCE FISHER 13-620-SI SN 0165403
 $E_{CORR} = -372$ mV
 $E_{PT} = -156$ mV
RUN PARAMETERS AND PLOT P260
 $E_p = -70$ mV SCE
 $E_{RP} = -237$ mV SCE

SPECIMEN HAS PITS ON IMMERSED SURFACES
DATA SAVED AS 316LTS2.DAT
David D 12/9/94

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION
CP PASS vs. R CT PASS IP -0.200 vs. OC ID 30 S VI 0.020 vs. OC FP -0.200 vs. OC
SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO HP 216 IR NONE
FL NONE RT HIGH STABILITY REF 0.24150 SCE WTK SOLID AR 0.000E+00 LS NO
IT 4.000E-02 ITA 0.000E+00 EN 0.000E+00 DEN 7.000E+00 OC -0.372

316L 1 molar Cl+0.01M S2O3 Ep=-237mV



David D 12/1/94

Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: B:316LTS2.dat
Pstat: VStat[] Ver 2
CP CYCLIC POLARIZATION
Date Run: 11-19-94
File Status: NORMAL
Time Run: 14:01:02

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	30	s	I Threshold	IT	5.000E-3	A/cm²
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	216					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.3720	V

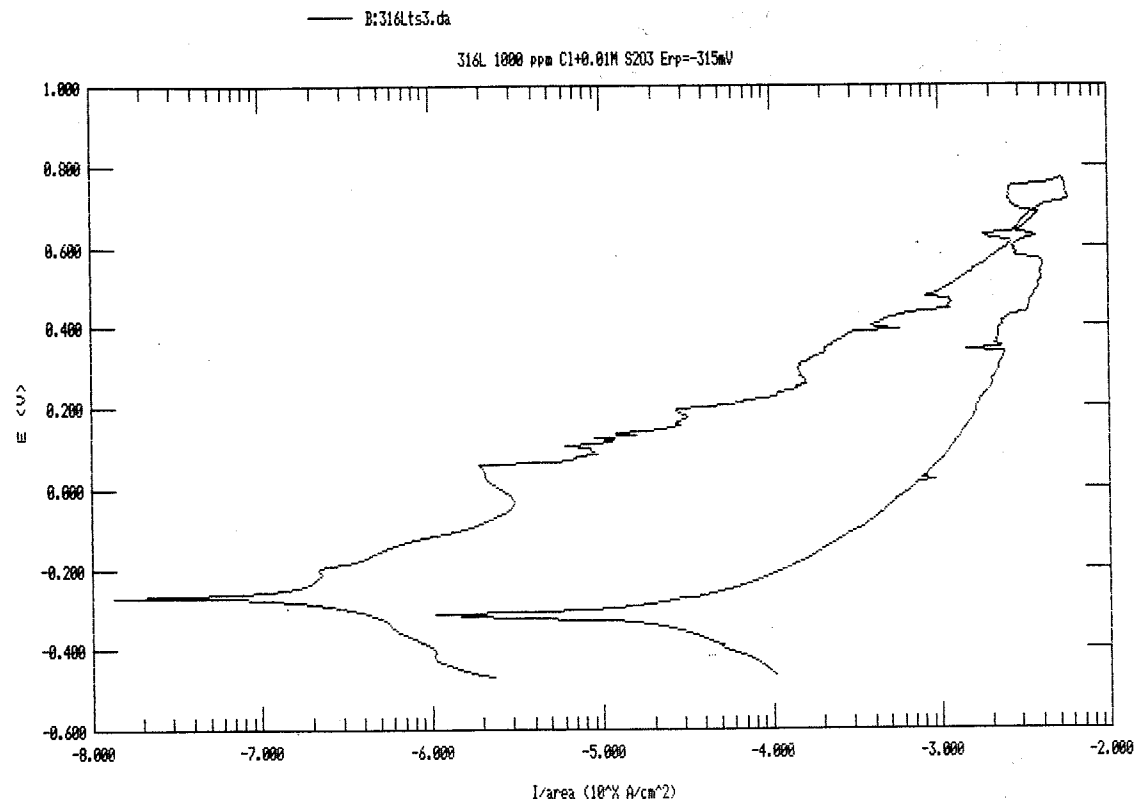
David D 12/9/94

316LTS3

OBJECTIVE DETERMINE E_p AND E_{RP} IN
+M DD 12/1/94 1000 PPM $Cl^- + 10^{-2}$ MOLAR $S_2O_3^{2-}$
SPECIMEN 316L P80746 600 SiC FINISH
 $l = 1.915$ $d = 0.246$
START WT 11.56389g
END WT 11.50803g
SOLUTION 1000 PPM $Cl^- + 10^{-2}$ MOLAR $S_2O_3^{2-}$
1.65289 g NaCl LOT 935535 (GENERATED W/ N_2)
1.58121 g $Na_2S_2O_3$ LOT 923931A
0.27 ml 0.02 g/ml NCl LOT FLO51290
START pH = 3.991
END pH = 8.385
TEMPERATURE = 95°C H_2 THERMOMETER 0323004
CALIBRATION DUE 21 MAR 95
POTENTIOSTAT EG&G VERSASTAT SN 20104
REFERENCE SCE FISHER 13-620-SI SN 0165403
 $E_{CORR} = -262mV$
 $E_p = -188mV$
RUN PARAMETERS p 262
 $E_{RP} = -315mV_{SCE}$
 E_p NOT WELL DEFINED BETWEEN +50 mV/sec AND +200 mV/sec
SPECIMEN HAS VISABLE PITS.

David D 12/12/94

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION: File Status: NORMAL Date Run: 11-20-94 Time Run: 15:53:12 Pstat: VStat[] Ver 2
CP PASS vs. R CT PASS IP -0.200 vs. OC ID 30 S VI 0.020 vs. OC FP -0.200 vs. OC
SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO NP 496 IR NONE
FL NONE RT HIGH STABILITY REF 0.24150 SCE WPK SOLID AR 8.000E+00 LS NO
IT 4.000E-02 ITA 8.000E+00 EW 8.000E+00 DEN 7.800E+00 OC -0.270



Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: B:316Lts3.dat
Pstat: VStat[] Ver 2
CP CYCLIC POLARIZATION
Date Run: 11-20-94
File Status: NORMAL
Time Run: 15:53:12

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	30	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	496					

Line Sync.	LS	no		6I Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	8.0000	g
				Open Circuit	OC	-0.2700	V

316L TS4

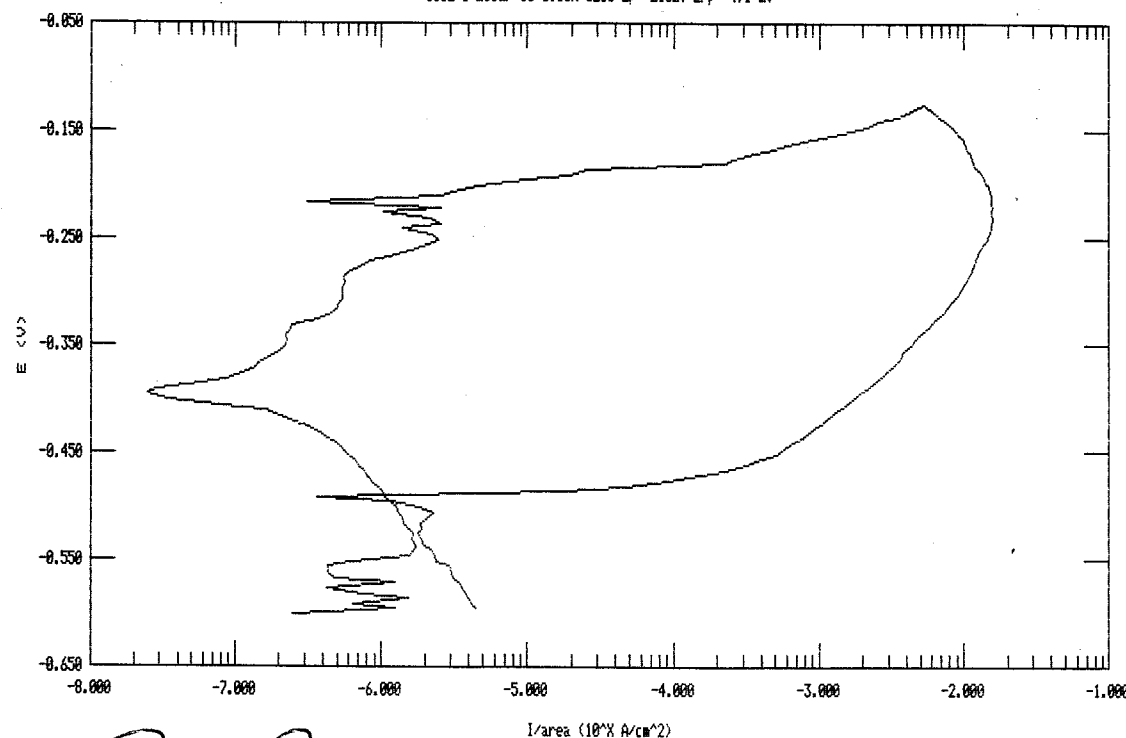
OBJECTIVE DETERMINE E_p & E_{Rp} IN 5 mM NaCl
 $Cl^- + 10^{-2}$ MOLAR $S_2O_3^{2-}$
SPECIMEN 316L P80746 600 SiC FINISH
 $L=1.915$ $d=0.248$
START WT 11.37339g
END WT 11.30481g
SOLUTION 5.0 MOLAR Cl^- AS NaCl 0.01 MOLAR
 $S_2O_3^{2-}$ AS $Na_2S_2O_3$ AT PH 9.0
1000 ml MADE AS FOLLOWS
292g NaCl LOT 935835
1.58347g $Na_2S_2O_3$ LOT 923931A
0.17 ml 0.02g/ml HCl LOT FLOS1290
SOLUTION DE AERATED W/ N_2 TANK # TT 45520
FROM LIQUID CARBONIC
START PH 3.89
END PH 7.317
TEMPERATURE = 95°C W/ THERMOMETER 0323004
CALIBRATION DUE 21 MARCH 95
POTENTIOSTAT EG&G VERSASTAT # ~~20104~~ 20104 DD 12/12/94
REFERENCE SCE FISHER 13-620-SI SN 0165403
ELONG -392mV KEITHLEY 614 # 467374
 E_{pt} -130mV KEITHLEY 614 # 467374
RUN PARAMETERS AND PLOT P264
 E_p -216mV SCE
 E_{Rp} -491mV SCE
SPECIMEN HAS PITS

DD 12/13/94

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS IP -0.200 vs. OC ID 30 S VI 0.020 vs. OC FP -0.200 vs. OC
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO MP 190 IR NONE
 FL NONE RT HIGH STABILITY REF 0.24150 SCE WPK SOLID AR 8.000E+00 LS NO
 IT 4.000E-02 ITR 6.000E+00 CM 0.000E+00 DEN 7.000E+00 OC -0.401

— B:316LT94.da

316L 5 molar Cl⁻+0.01M S2O3 Ep=-216mV Erp=-491 mV



Red Q 12/13/94

Model 352/252 Corrosion Analysis Software, v. 2.01
 Filename: B:316LT94.dat
 Pstat: VStat[] Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 11-22-94

File Status: NORMAL
 Time Run: 17:40:59

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	30	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95 s
No. of Points	NP	190				

Line Sync.	LS	no	GI Time Const.	TC	Off
Rise Time	RT	high stability	IR Mode	IR	none
Working Elec.	WE	Solid	Filter	FL	Off
Sample Area	AR	8.000	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	7.800	Equiv. Wt.	EW	0.0000 g
			Open Circuit	OC	-0.4010 V

Red Q 12/13/94

316LTSS

OBJECTIVE DETERMINING E_p & E_{rp} IN 1 molar Cl⁻ +

0.01 molar S₂O₃²⁻

SPECIMEN 316L P80746 600 S.C FINISH

L_c 1.914 Cl^- 0.247 START WT 11.23684g

END WT 11.18794g

SOLUTION 1 molar Cl⁻ + 0.01 molar S₂O₃²⁻

1000 ml MAKE AS FOLLOWS

58.44259 g NaCl LOT 935535

1.58664 g Na₂S₂O₃ LOT 923931A

0.20ml 0.02 g/ml HCl LOT FLOS1290

+ DI WATER TO 1000 ml

START PN 3.89

END PN 7.785

T=95°C Hg THERMOMETER 0323004

SOLUTION DEGASSED w/ N₂ (99.999%) TANK TT 45520

FROM LIQUID CARBONIC

POTENTIOSTAT EG&G VERSASTAT SN 20104

DATA SAVED AS 316LTSS.DAT

REFERENCE SCE FISHER 13-620-51 SN 0165403

E_{corr} -328mV KEITHLEY 614 SN 467374

E_p -180mV KEITHLEY 614 SN 467374

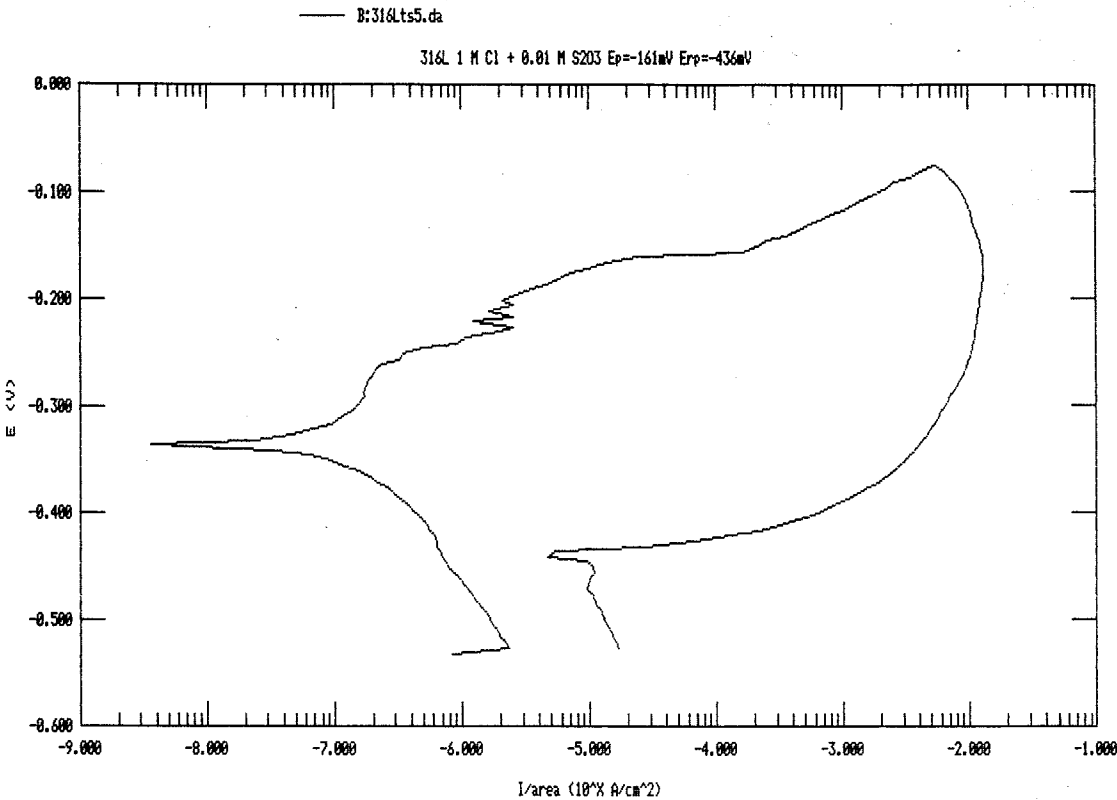
PITS VISIBLE ON SPECIMEN

E_p -161mV

E_{rp} -436mV

Red Q 12/16/94

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION
OP PASS vs. R CT PASS
SI 5.000E-03 SR 1.669E-04
FL NONE RT HIGH STABILITY
IT 4.000E-02 ITA 8.000E+00
File Status: NORMAL
Date Run: 11-24-94
Time Run: 17:04:07
IP -0.200 vs. OC
ID 30 S
V1 0.020 vs. OC
NP 182
CR AUTO
HP 182
REF 0.24150 SCE
WPK SOLID
AR 8.000E+00
DEN 7.000E+00
OC -0.331
Pstat: VStat[] Ver 2
FP -0.200 vs. OC
IR NONE
LS NO



Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: B:316Lts5.dat
Pstat: VStat[] Ver 2
CP CYCLIC POLARIZATION
Date Run: 11-24-94

File Status: NORMAL
Time Run: 17:04:07

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	30	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	182					

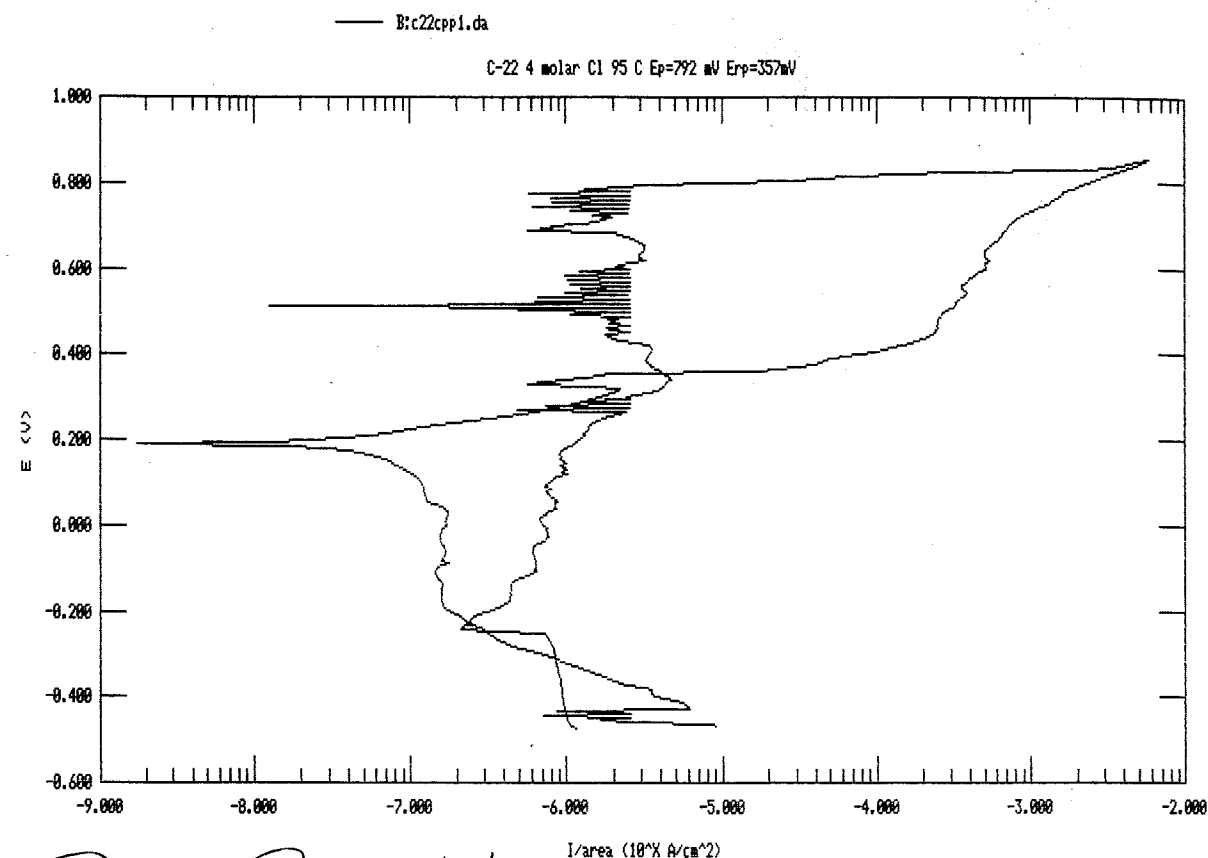
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EN	0.0000	g
				Open Circuit	OC	-0.3310	V

C22 CPP1.DAT C22 4m Cl
OBJECTIVE DETERMINE E_p AND E_{pp} OF ~~AL~~ Zn 2/15/95
C-22 IN 4mCl⁻ AT 95°C
SPECIMEN C22 HEAT# 2277-8-3175
 $I_p = 1.915$ $d_p = 0.248$
START WT 12.29270g
END WT ~~12.28~~ 12.28689g 2/16/95
SOLUTION 4mCl⁻ AS NaCl 85PPM $NaCO_3$ 20PPM SO_4^{2-}
10 PPM NO_3^- 2PPM F^- 1000 ml MAKE AS FOLLOWS
233.82010 g NaCl LOT 941616
0.12034 g $NaHCO_3$ LOT 897789
20 ml SO_4^{2-} 2/95 STOCK SOLUTION IWA6 085 p231
10 ml NO_3^- 2/95 STOCK SOLUTION IWA6 085 p231
2 ml F^- 2/95 STOCK SOLUTION IWA6 085 p231
+ DI WATER TO 1000 ml
START pH 7.48
END pH 8.35
TEMPERATURE = 95°C N_2 THERMOMETER 183303
CALIBRATION DUE 30 JULY 95
SOLUTION DE AERATED WITH 99.999% N_2 FROM
LIQUID CARBONIC TANK # 588637
POTENTIOSTAT G606 VERSASTAT SN 20104
DATA SAVED AS C22CPP1.DAT
REFERENCE SCE FISHER 13-620-51 SN 4280302
 $E_{CORR} = -397$ mV KEITHLEY 614 SN 555368
 $E_{PT} = -416$ mV KEITHLEY 614 SN 555368
SOLUTION DE AERATED FOR 4 HOURS PRIOR TO START
OF TEST

A FEW VERY SMALL SHALLOW PITS ARE VISIBLE
ON THE SURFACE

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO NP 530
 FL NONE RT HIGH STABILITY REF 0.24150 SCE WKC SOLID AR 8.000E+00 LS NO
 IT 4.000E-02 ITA 8.000E+00 EN 0.000E+00 IEN 8.100E+00 OC -0.373

Filename: Btc22cpp1.dat
 File Status: NORMAL Date Run: 01-24-95 Time Run: 15:37:01
 Pstat: VStat[] Ver 2



David D. 2/16/95

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: Btc22cpp1.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 01-24-95

File Status: NORMAL

Time Run: 15:37:01

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	530					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	8.100	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.3730	V

David D. 2/16/95

C22CPP2.DAT

OBJECTIVE DETERMINE E_p AND E_{RP} OF C-22
 IN 40% $MgCl_2$ AT 95°C

SPECIMEN C22 HEAT # 2277-8-3175

$L = 1.915"$ $d = 0.249"$

START WT = 12.31740g

END WT = 12.29392g

SOLUTION 40% $MgCl_2$ FISHER LOT # 944064

PREPARED USING ASTM G31 BOILING POINT

CURVE BOILING POINT = 138°C

TEMPERATURE OF TEST = 95°C N_2 THERMOMETER 0323002

SOLUTION DEAERATED WITH 99.999% N_2 FROM

LIQUID CARBONIL TANK # 588637

POTENTIOSTAT EG&G VGREASTOT SN 20104

DATA SAVED AS C22CPP2.DAT

REFERENCE SCE FISHER 13-620-S1 SN 4280302

E_{corr} -213mV KEITHLEY 614 SN 555368

E_p +341mV KEITHLEY 614 SN 555368

SOLUTION DEAERATED AT TEMPERATURE FOR
 TWO HOURS PRIOR TO START OF TEST.

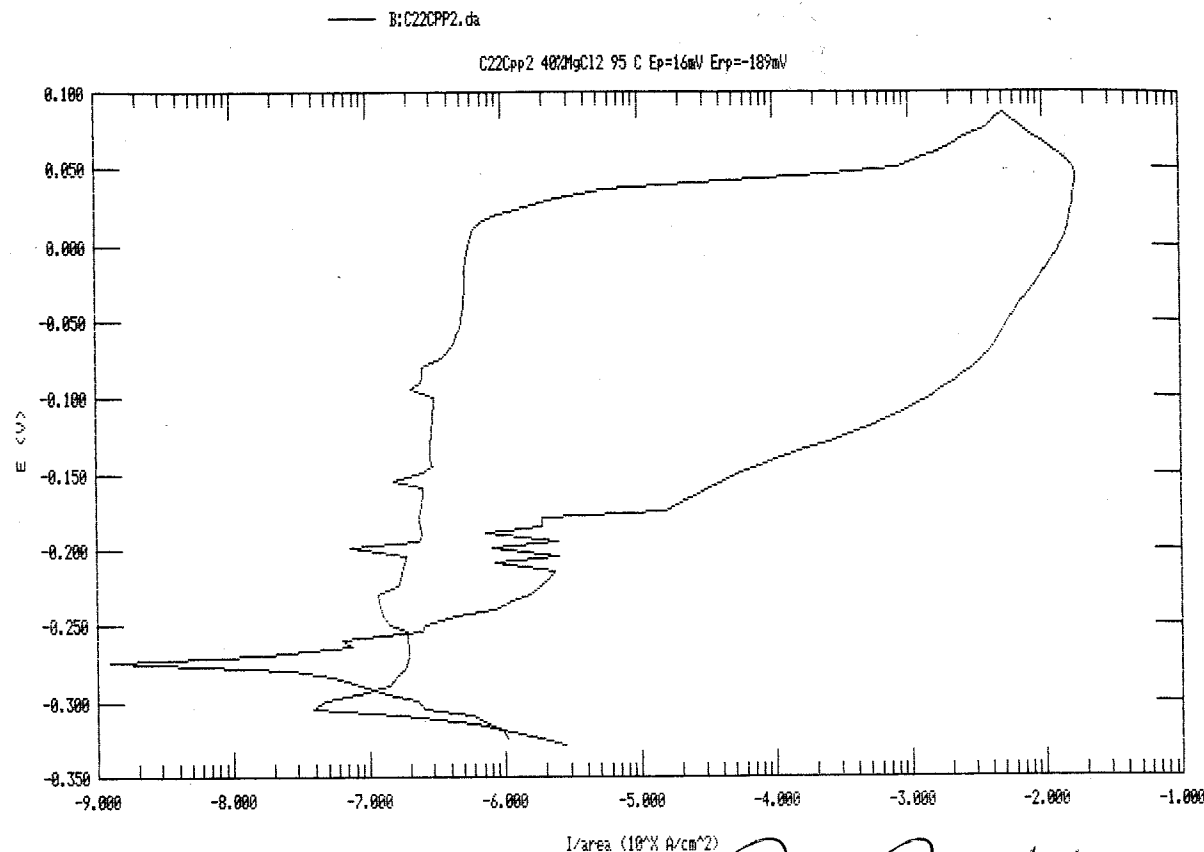
LARGE AREAS OF CORROSION ON SPECIMEN
 RUN PARAMETERS AND PLOTS p 270

David D.
 2/21/95

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01
 FL NONE RT HIGH STABILITY REF 0.24150 SCE
 IT 4.000E-02 ITA 8.000E+00 EW 8.000E+00
 DEN 8.100E+00 OC -0.229

Filename: B:\C22CPP2.dat
 Date Run: 01-26-95 Time Run: 17:25:07
 ID 60 S V1 0.020 vs. OC
 CR AUTO NP 166
 WRK SOLID AR 8.000E+00
 LS NO

Pstat: VStat[] Ver 2



Drill 2/21/95

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: B:\C22CPP2.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 01-26-95

File Status: NORMAL

Time Run: 17:25:07

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	166					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	8.100	g/ml	Equiv. Wt.	EW	8.0000	g
				Open Circuit	OC	-0.2290	V

Drill 2/21/95

C22CPP3.DAT

OBJECTIVE DETERMINE E_p AND E_{pp} IN 9.1 MOLAL
 LiCl AT 95°C

SPECIMEN C.22 NEAT # 2277-8-3175

$L = 1.915$ $d = 0.4$ $2/27/95$ $0.248''$

START WT 12.25125g

END WT 12.24651g

SOLUTION 9.1 MOLAL LiCl 231.5g LiCl LOT

941585 + 600 ml DI WATER pH OF SOLUTION

ADJUSTED TO 4.0 BY THE ADDITION OF HCl

LOT FLOSI290

TEMPERATURE = 95°C N_2 THERMOMETER 183303

SOLUTION PREPARED WITH 99.999% N_2 FROM LIQUID CARBONIC

TANK # 588637

POTENTIOSTAT EG&G VERSASTAT SN 20104

DATA SAVED AS C22CPP3.DAT

REFERENCE SCE FISHER 13-620-SI SN 4280302

$E_{corr} = -448mV$ KEITHLEY 614 SN 555368

$E_p = -78mV$ KEITHLEY 614 SN 555368

SOLUTION PREPARED AT TEMPERATURE FOR 4 HOURS

PRIOR TO START OF TEST.

END pH 4.67

BUBBLE IN SALT BRIDGE

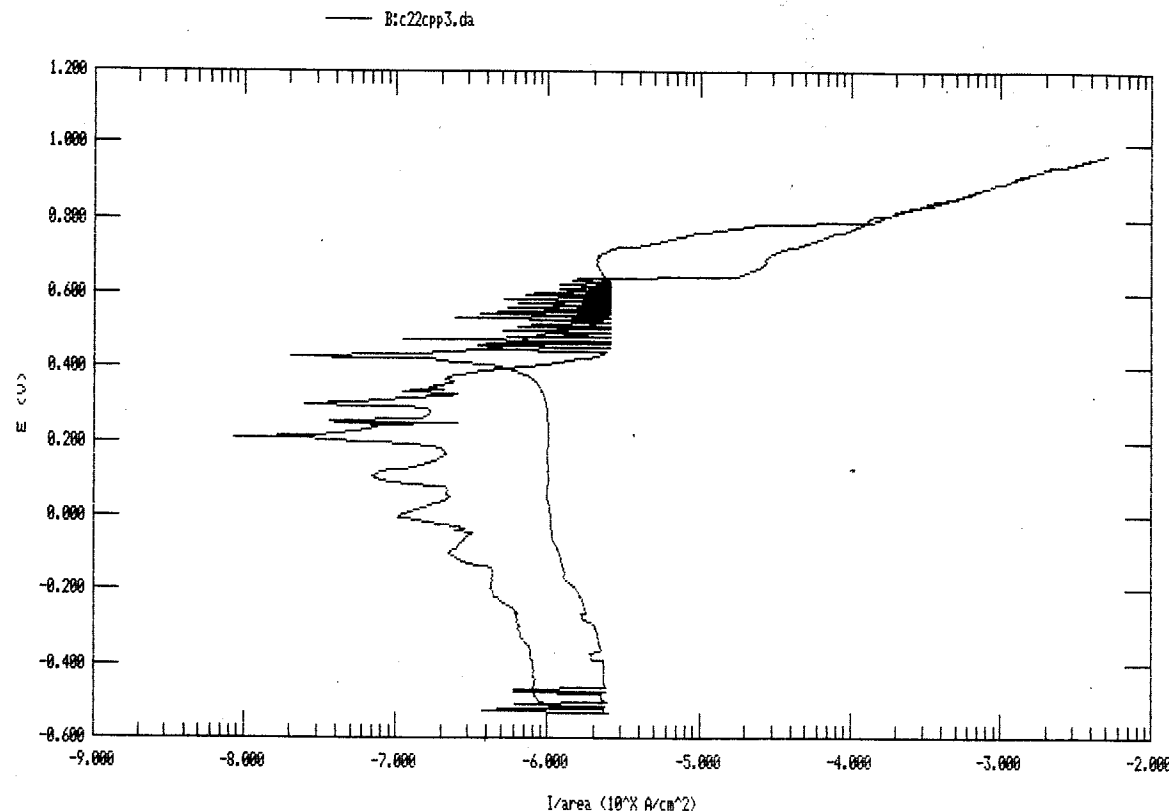
RUN PARAMETERS AND PLOT P272

$E_p = 712mV$ $E_{pp} = 642mV$

SPECIMEN HAS SHALLOW PITS, BLUE COLOR FILM

Drill 3/2/95

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 File Status: NORMAL Date Run: 01-28-95 Time Run: 17:04:08 Pstat: VStat[] Ver 2
 CP PASS vs. R CT PASS IP -0.100 vs. OC ID 60 S VI 0.020 vs. OC FP -0.100 vs. OC
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO NP 602 IR NONE
 FL NONE RT HIGH STABILITY REF 0.24150 SCE MTK SOLID AR 8.000E+00 LS NO
 IT 4.000E-02 ITA 8.000E+00 EW 0.000E+00 DEN 8.100E+00 OC -0.433



Paul R 3/2/95

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: Btc22cpp3.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 01-28-95

File Status: NORMAL

Time Run: 17:04:08

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95 s
No. of Points	NP	602				

Line Sync.	LS	no	GI Time Const.	TC	Off
Rise Time	RT	high stability	IR Mode	IR	none
Working Elec.	WE	Solid	Filter	FL	Off
Sample Area	AR	8.000 cm^2	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	0.100 g/ml	Equiv. Wt.	EW	0.0000 g
			Open Circuit	OC	-0.4330 V

Paul R 3/2/95

C22CPP4.DAT

OBJECTIVE DETERMINE E_p AND E_{Rp} OF C22 IN
 6.2 MOLAL NaCl AT 95°C

SPECIMEN C22 600S;C HEAT # 2277-8-3175

$l = 1.914$ $d = 0.247$

START WT = 12.20587g

SOLUTION 6.2 MOLAL NaCl AT pH 4.0

362.32 g NaCl LOT 941616 + HCl LOT FLOS1290
 TO pH 4.0 + 1000 ml DI WATER

TEMPERATURE = 95°C Hg THERMOMETER 183303

SOLUTION DEAERATED WITH N_2 FROM LIQUID

CARBONIC TANK # 588637

POTENTIOSTAT EG&G VERSASTAT SN 20104

DATA SAVER AS C22CPP4.DAT

REFERENCE FISHER SCE 13-620-S1 SN 4280302

$E_{corr} = -449$ mV

$E_{pt} = -190$ mV

END PH 6.53

RUN PARAMETERS AND PLOT p275

END WT 12.20475g

SMALL SHALLOW PITS ON SPECIMEN

SPECIMEN HAS GOLD, GREEN, RED COLOR FILM

$E_p = 662$ mV $E_{Rp} = 632$ mV

Paul R

825TS1

OBJECTIVE DETERMINE E_p AND E_{RP} IN 6.2 MOLAR
 Cl^- + 0.01 MOLAR $S_2O_3^{2-}$ AT 95°C

SPECIMEN ALLOY 82S NH437IFG 600 S/C FISHER

$L = 1.914$ $d = 0.248$

START WT 11.54101g

SOLUTION 6.2 MOLAR NaCl 0.01 MOLAR $S_2O_3^{2-}$

AT PH 4.0 253.62g NaCl LOT 941616

1.29890g $Na_2S_2O_3$ LOT 923931N 700 ml D5

WATER AND NaCl LOT FLOSI290 TO PH 4.0

TEMPERATURE = 95°C H_g THERMOMETER 183303

SOLUTION DEGASSED WITH N_2 FROM LIQUID

CARBONIC TANK # 588637

POTENTIOSTAT 6616 VERSOSTAT SN 20104

DATA SAVED AS 825TS1.DAT

REFERENCE SCE FISHER 13-620-SI SN 4280302

$E_{corr} = -500$ mV KEITHLEY 614 SN 467374

$E_p = -195$ mV KEITHLEY 614 SN 467374

END PH = 7.534

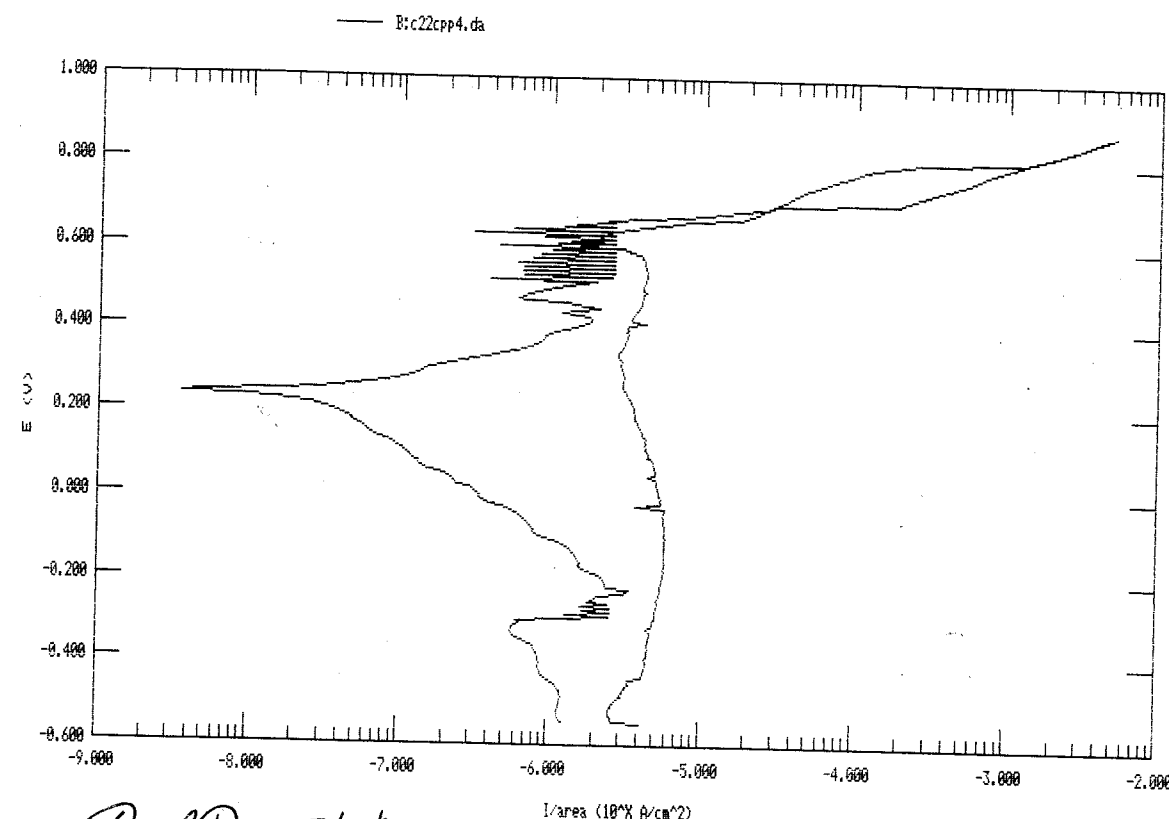
END WT.

MANY PITS ON SPECIMEN

3/3/95

C22 CPP4 P273

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 File Status: NORMAL
 Date Run: 01-29-95
 Time Run: 17:00:16
 Pstat: VStat[] Ver 2



3/2/95

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: Btc22cpp4.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 01-29-95

File Status: NORMAL

Time Run: 17:00:16

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	570					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	8.100	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.4480	V

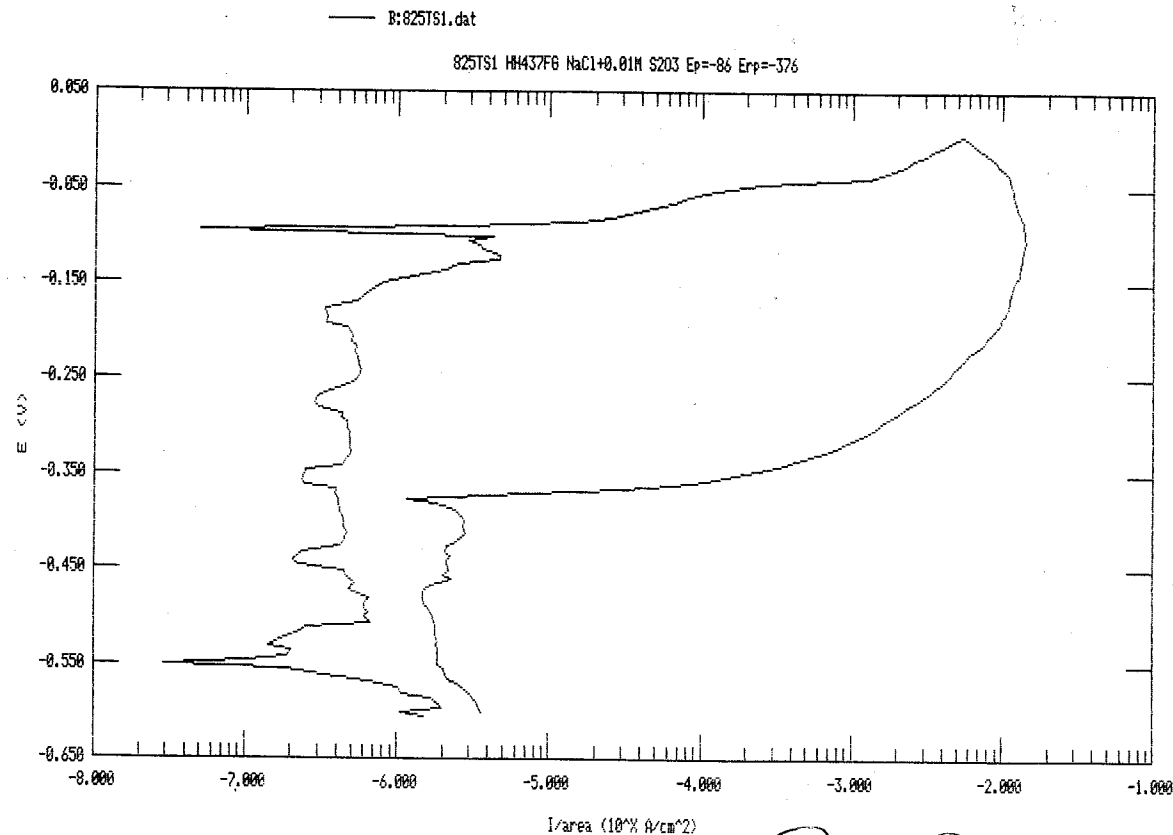
3/2/95

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04
 FL NONE RT HIGH STABILITY
 IT 4.000E-02 ITA 8.000E+00

File Status: NORMAL
 IP -0.100 vs. OC
 ST 2.995E+01
 REF 0.24150 SCE
 EN 0.000E+00

Filename: B:825TS1.dat
 Date Run: 01-31-95
 ID 60 S
 CR AUTO
 MP 244
 AR 8.000E+00
 OC -0.506

Pstat: VStat[] Ver 2
 VI 0.020 vs. OC
 FP -0.100 vs. OC
 IR NONE
 LS NO



Donnell 3/3/95

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: B:825TS1.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 01-31-95

File Status: NORMAL

Time Run: 17:10:36

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	244					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.000	cm^2	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	8.100	g/ml	Equiv. Wt.	EW	8.0000	g
				Open Circuit	OC	-0.5060	V

Donnell 3/3/95

C22 CPP5

OBJECTIVE DETERMINE E_p AND E_{pp} OF C22 IN
 6.2 MOLAL NaCl + 0.01 MOLAL SiO_3^{2-} AT 95°C
 SPECIMEN C22 600 S.C. FINISH NOST 2277-8-3175
 $l = 1.914$ $d = 0.248$
 START WT 12.33470g
 SOLUTION 6.2 MOLAL NaCl + 0.01 MOLAL SiO_3^{2-} AT pH 4.0
 253.6 g NaCl LOT 941616
 1.263 g Na_2SiO_3 LOT 923931A
 700 ml DE WATER
 0.18 ml 0.02g/ml HCl LOT FLOS1290
 TEMPERATURE 95°C N_2 THERMOMETER 183303
 SOLUTION DEAERATED WITH 99.999% N_2 FROM
 LIQUID CARBONIC TANK # 588637
 POTENTIOSTAT EG&G URBASTAT SN 20104
 DATA SAVED AS C22CPP5.DAT
 REFERENCE SCE FISHER 13-620-S1 SN 4280302
 Ecorr -379mV KETTLER 614 SN 467374
 Epe -175mV KETTLER 614 SN 467374
 SOLUTION DEAERATED FOR 6 HOURS PRIOR TO TEST
 ~~$E_p = 662\text{mV}$~~ $E_p = 662\text{mV}$
 $E_{pp} = 642\text{mV}$
 END WT 12.32533g
 END PN 4.77
 RUN PARAMETERS AND PLOT P 278
 SOME SPOTS AND VERY SMALL PITS ON SPECIMEN

Donnell 3/4/95

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04
 FL NONE RT HIGH STABILITY
 IT 4.000E-02 ITA 0.000E+00

File Status: NORMAL
 IP -0.100 vs. OC
 ST 2.995E+01
 REF 0.24150 SCE
 EN 0.000E+00

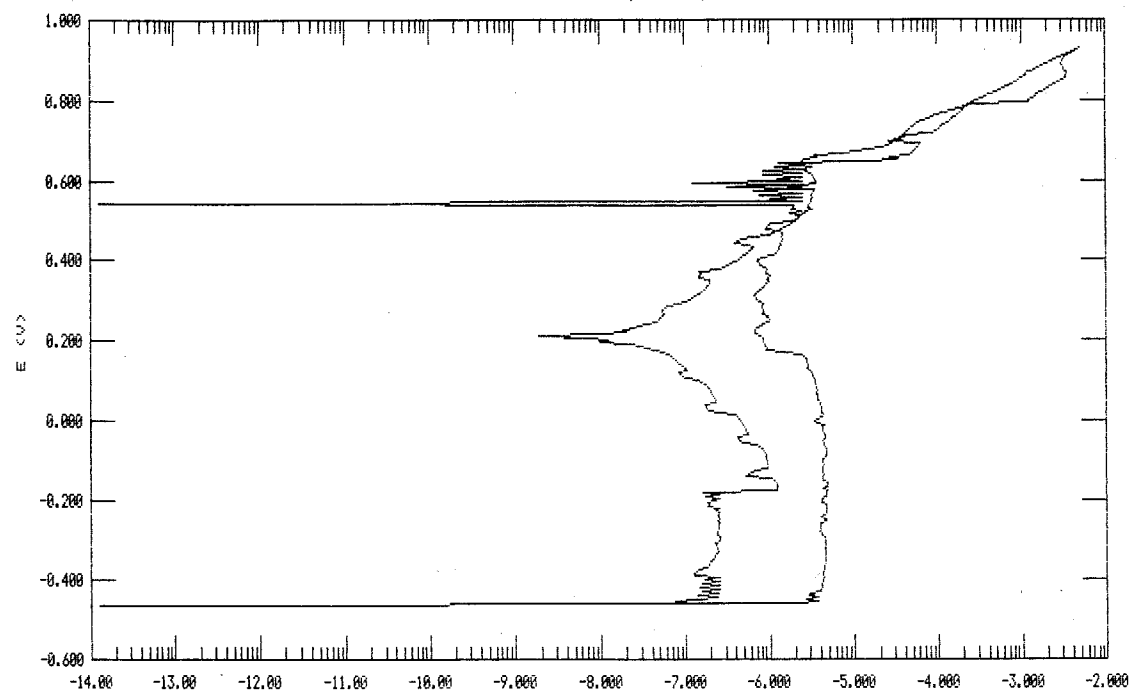
Filename: B:c22cpp5.dat
 Date Run: 02-02-95
 Time Run: 00:41:12
 ID 60 S
 CR AUTO
 WK SOLID
 DEN 8.100E+00

Pstat: VStat[] Ver 2
 VI 0.020 vs. OC
 NP 558
 AR 8.000E+00
 OC -0.363

FP -0.100 vs. OC
 IR NONE
 LS NO

B:c22cpp5.da

C22CPP5 NaCl+0.01M5203 Ep=662mV Epp=642

Iarea (10⁻⁴ A/cm²)

Dred D 3/14/95

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: B:c22cpp5.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 02-02-95

File Status: NORMAL

Time Run: 00:41:12

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95 s
No. of Points	NP	558				

Line Sync.	LS	no		GI Time Const.	TC	Off
Rise Time	RT	high stability		IR Mode	IR	none
Working Elec.	WE	Solid		Filter	FL	Off
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	8.100	g/ml	Equiv. Wt.	EW	0.0000 g
				Open Circuit	OC	-0.3630 V

3/14/95

Dred D

C22CPP6.DAT

OBJECTIVE DETERMINE E_p AND E_{RP} OF C22 IN

6.2 MOLAL NaCl AT 95°C

SPECIMEN C22 600S.C. HEAT 2277-8-3175

 $L = 1.914$ $d = 0.249$

START WT 12.25213 g

SOLUTION 6.2 MOLAL NaCl AT pH 4.0

253.6 g NaCl LOT 941616 + 700 mL DI

WATER AND 0.15 ml 0.02g/ml NaCl LOT FLOS1290

TEMPERATURE = 95°C H_g THERMOMETER 183303SOLUTION DEAERATED WITH 99.999% N₂ FROM

LIQUID CARBONIC TANK # 588637

POTENTIOSTAT EG&G VERSASTAT SN 20104

DATA SAVED AS C22CPP6.DAT

REFERENCE SCE FISHER 13-620-S1 SN 4280302

 $E_{corr} = -497$ mV KEITHLEY 614 SN 467374 $E_p = +44$ mV KEITHLEY 614 SN 467374

SOLUTION DEAERATED FOR 3 HOURS PRIOR TO TEST

END pH 5.129

END WT 12.24729 g

RUN PARAMETERS p 280

SOME SPOTS AND VERY SMALL PITS ON SPECIMEN

Dred D
3/14/95

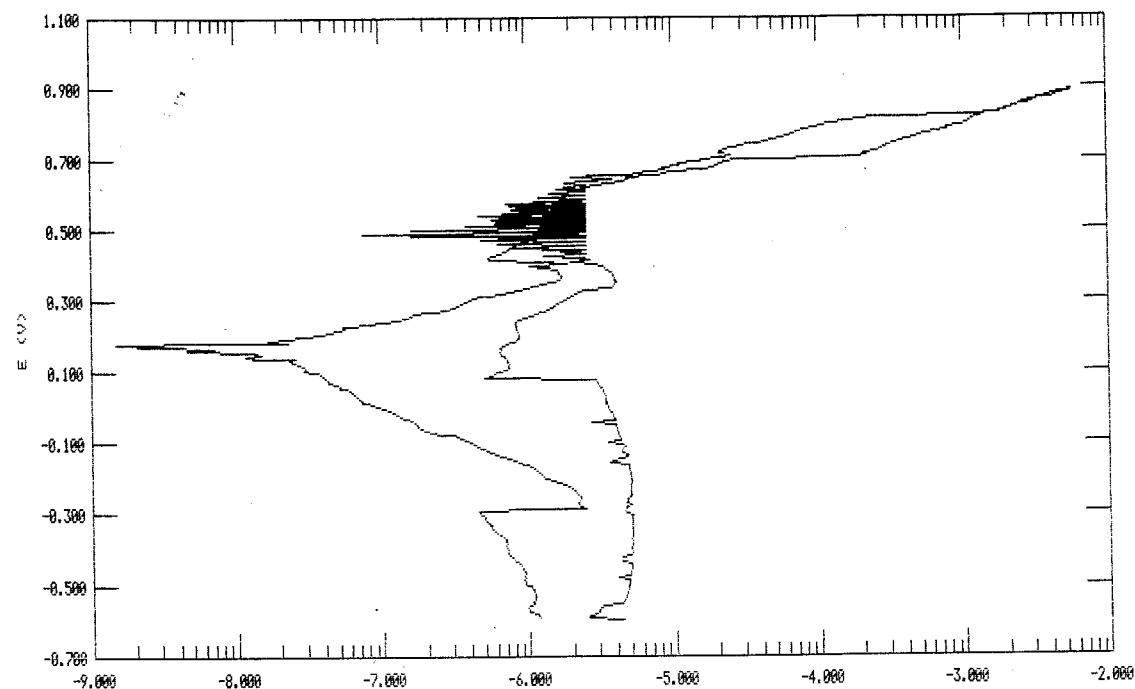
Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04
 FL NONE RT HIGH STABILITY
 IT 4.000E-02 ITA 8.000E+00

Filename: B:c22cpp6.dat
 File Status: NORMAL
 Date Run: 02-02-95
 ID 60 S
 CR AUTO
 MRK SOLID
 DEN 8.100E+00

Pstat: VStat[] Ver 2
 Time Run: 17:33:31
 VI 0.020 vs. OC
 MP 596
 AR 8.000E+00
 OC -0.499

B:c22cpp6.da

C22CPP6 NaCl Ep=656mV Epp=626mV

I/area (10⁻⁴ A/cm²)

David D... 3/14/95

Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: B:c22cpp6.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 02-02-95

File Status: NORMAL

Time Run: 17:33:31

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.1000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	-0.1000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95 s
No. of Points	NP	596				

Line Sync.	LS	no		GI Time Const.	TC	Off
Rise Time	RT	high stability		IR Mode	IR	none
Working Elec.	WE	Solid		Filter	FL	Off
Sample Area	AR	8.000	cm ²	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	8.100	g/ml	Equiv. Wt.	EW	0.0000 g
				Open Circuit	OC	-0.4990 V

David D... 3/14/95

825 CPP8.DAT

Objective: Determine E_p and E_{pp} of 825 in 1000 ppm Cl^- w/ 0.01M $S_2O_3^{2-}$ @ pH 4.0 at 95°C

Specimen 825 Heat HH4371 FG
 immersed l 1.759" d 0.249"

Solution: 1000 ppm Cl^- ; 0.01M $S_2O_3^{2-}$ @ pH 4.0

3.2810g NaCl Fish. lot # 941616

3.1604g $Na_2S_2O_3$ " " # 933931A

2L - DI water adjust w/ 0.2 ml of 0.025g/ml HCl lot FL051290

Temperature = 95°C Hg thermometer # 183303

Sponge with 99.999% N_2 liquid carbon tank # 588637

Potentiostat Versastat SN 20104

Data saved as 825CPP8.DAT

Reference SCE Fisher 13-620-51 SN 4280302

E_{cor} -280mV Keithly 614 SN 467374

E_{pp} -189 " " " "

Solution deaerated 2 hrs. before start of test

End pH 9.385

Start pH 3.993

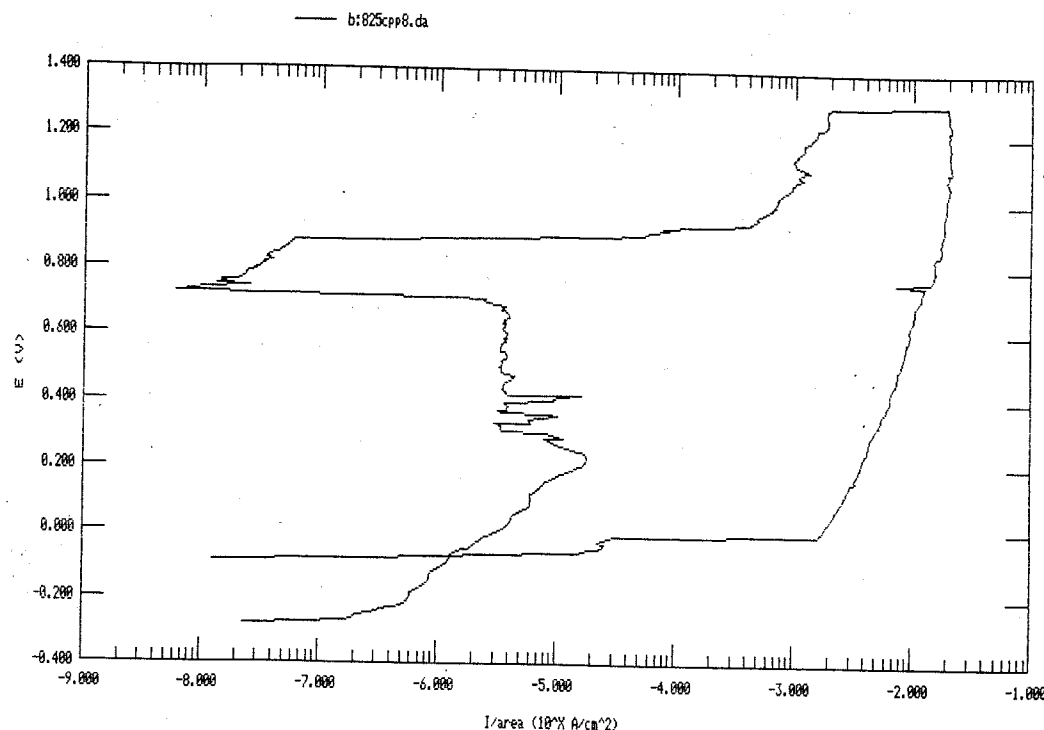
Run parameter p. 282

Specimen had many pits

3/15/95

Walter J. Moehle

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 File Status: NORMAL Date Run: 03-13-95 Time Run: 12:22:17 Pstat: VStat[] Ver 2
 CP PASS vs. R CT PASS IP 0.000 vs. OC ID 60 S VI 0.020 vs. OC FP 0.000 vs. OC
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO NP 596 IR NONE
 FL NONE RT HIGH STABILITY REF 0.24150 SCE WPK SOLID AR 9.275E+00 LS NO
 IT 7.500E-02 ITA 1.500E+01 EW 0.000E+00 DEN 7.800E+00 OC -0.282
 Comment: 825 1000 Cl/0.01M S2O3/pH 4.00



Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: b:825cpp8.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 03-13-95

File Status: NORMAL

Time Run: 12:22:17

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm ²
				Final Pot.	FP	0.0000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	596					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	9.275	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	8.140	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.2820	V

Comment: 825 1000 Cl/0.01M S2O3/pH 4.00

825CPP7.DAT

Objective: Determine E_p + E_{RP} of 825 in 1M Cl^- ; 0.01M $S_2O_3^{2-}$; pH 4
 at 95°C

Specimen: 825 heat HH4371FG

immersed l 1.563" d 0.248"

Solution: 1M Cl^- ; 0.01M $S_2O_3^{2-}$ @ pH 4.0

117.0137 NaCl Fisher lot # 941616

3.1581 $Na_2S_2O_3$ " " 923931A

2L DI water; adjust w/ 0.10 ml 0.025 M HCl lot FLO51290

Temperature: 95°C Hg thermometer #183303

Sponge w/ 99.999% N_2 liquid carbon tank #588637

Potentiostat: Versastat SN 20104

Data saved as 825CPP7.DAT

Reference SCE Fisher 13-620-51 SN 4280302

E_{can} -249 mV Keithly 614 SN 467374

E_{pc} -167 mV " " " "

Solution deaerated 2 hrs. before start

Start pH 4.010

End pH 8.881

Run parameter p. 284

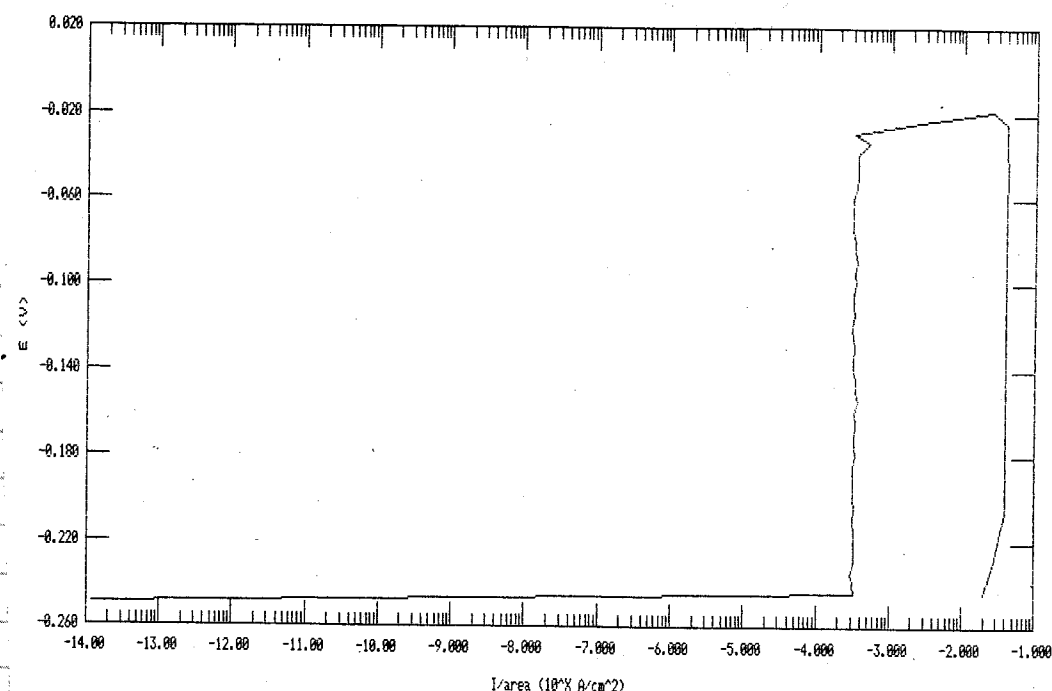
Bubble in Luggin probe caused bad potential control. Must be re-run.

3/15/95

Walter J. Machowski

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS File Status: NORMAL Date Run: 03-15-95 Time Run: 10:52:40 Pstat: VStat[] Ver 2
 SI 5.000E-03 SR 1.669E-04 IP 0.000 vs. OC ID 60 S VI 0.020 vs. OC FP 0.000 vs. OC
 FL NONE RT HIGH STABILITY REF 0.24150 SCE CR AUTO MP 92 IR NONE
 IT 4.084E-02 ITA 8.169E+00 EN 0.000E+00 DEN 8.140E+00 OC -0.249 LS RS
 Comment: 825 IM Cl; 0.01M S2O3; pH 4.0

b:825CPP7.DA



Model 352/252 Corrosion Analysis Software, v. 2.01
 Filename: b:825CPP7.DAT
 Pstat: VStat[] Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 03-15-95

File Status: NORMAL
 Time Run: 10:52:40

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	4.999E-3	A/cm^2
				Final Pot.	FP	0.0000	V oc
Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	92					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.169	cm^2	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	8.140	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.2490	V

Comment: 825 IM Cl; 0.01M S2O3; pH 4.0

825CPP9.DAT

Objective: Determine E_p and E_{ra} of 825 in $1MCl^-$; $0.01M S_2O_3^{2-}$; pH 4 at $95^\circ C$

Specimen: 825 Lead # HH 4371 FC
 immersed l 1.719" d 0.248"

Solution: $1MCl^-$; $0.01M S_2O_3^{2-}$; pH 4.0
 same solution as p. 283

Temperature: $95^\circ C$ Hg thermometer #183303

Sponge with 99.999% H_2 liquid carbon tank #588637

Potentiostat: Versastat SN 20104

data saved as

Reference: SCE Fisher 13-620-51 SN 4280302

E_{com} -229 mV Keithly 614 SN 467874

E_{pc} -163 mV " " " "

Solution deaerated 2 hrs. before start of test

start pH 4.010

end pH 8.201

Run parameter p. 286

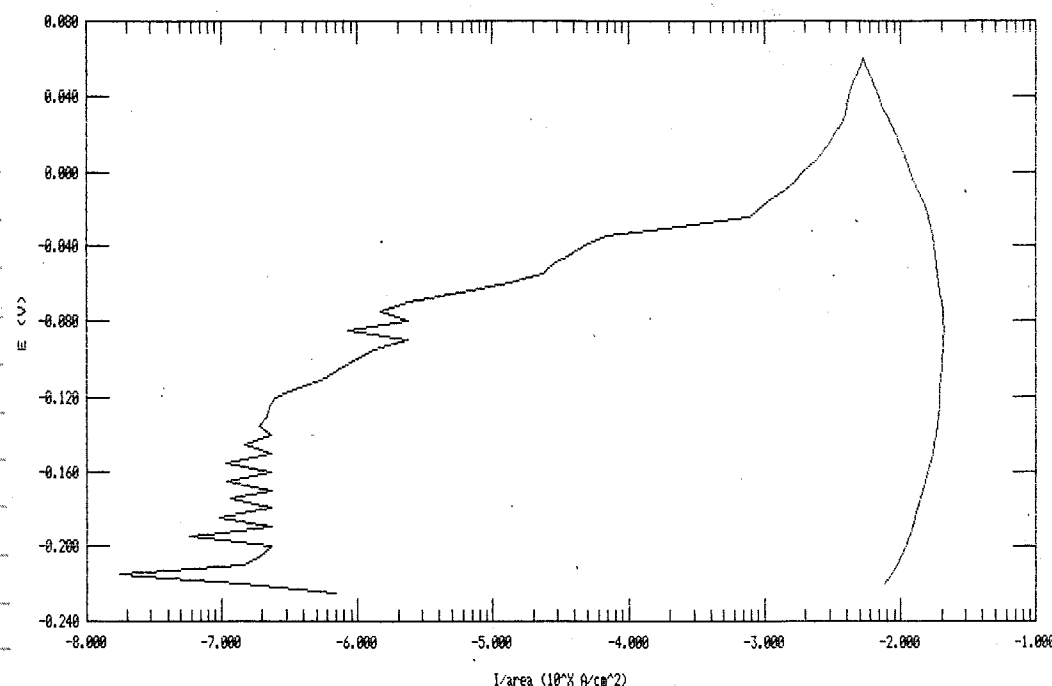
Specimen pitted + solution dark w/ black ppt.

3/16/95

Walter J. Mochowski

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO NP 114 IR NONE
 FL NONE RT HIGH STABILITY REF 0.2415 SCE WKS SOLID AR 0.641E+00 LS NO
 IT 4.321E-02 ITR 0.641E+00 EN 0.000E+00 DEN 7.800E+00 UC -0.225
 Comment: 825 IM C1; 0.01M S2O3; pH 4

— b:825cpp9.da



Model 352/252 Corrosion Analysis Software, v. 2.01
 Filename: b:825cpp9.dat
 Pstat: VStat[] Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 03-16-95

File Status: NORMAL
 Time Run: 09:54:45

Cond. Time	CT	pass	s	Initial Pot.	IP	0.0000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.001E-3	A/cm²
				Final Pot.	FP	0.0000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95 s
No. of Points	NP	114				

Line Sync.	LS	no	GI Time Const.	TC	Off
Rise Time	RT	high stability	IR Mode	IR	none
Working Elec.	WE	Solid	Filter	FL	Off
Sample Area	AR	8.641 cm²	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	8.140 g/ml	Equiv. Wt.	EW	0.0000 g
			Open Circuit	OC	-0.2250 V

Comment: 825 IM C1; 0.01M S2O3; pH 4

C22CPP10.DAT

Objective: To determine E_p and E_{rp} in 1000 ppm Cl^- ; 0.01M $S_2O_3^{2-}$
 pH 4 @ 95°C

Specimen: C-22 immersed l 1.612" d 0.248"
 Solution: 1000 ppm Cl^- ; 0.01M $S_2O_3^{2-}$; pH 4
 1.6393 g NaCl Fisher lot # 94616
 1.5798 g $Na_2S_2O_3$ " " 923931A
 dil. to 1L w/ DI H_2O
 adjust pH w/ 0.25M HCl lot # FL051290 0.1ml
 Temperature: 95°C H_g thermometer # 183303
 Sponge w/ 99.999% N_2 liquid carbonic tank # 588637
 Potentiostat: Versastat SN 20104
 Data saved as C22CPP10.DAT

Reference: SCE Fisher 13-620-51 SN 4280302
 E_{can} -243 mV Keithley 614 SN 467324
 E_{pt} -183 mV " " " "

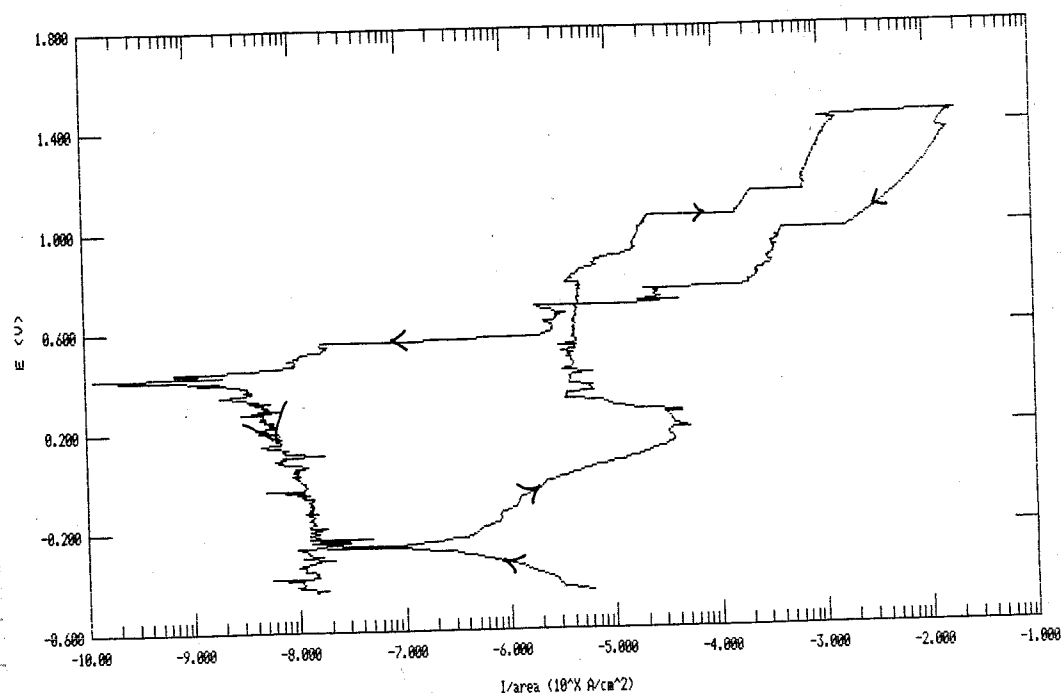
Solution deaerated 2 hrs before start of test
 Start pH 4.011
 End pH 6.236
 Run parameter p. 288
 Sample pitted; solution had greenish tinge

3/17/95
 Walter J. MacKowski

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04
 FL NONE RT HIGH STABILITY
 IT 4.208E-02 ITR 8.413E+00
 Comment: C22 1000ppm Cl; 0.01M S2O3; pH 4

Filename: b1c22cpp10.dat
 Date Run: 03-17-95
 Time Run: 09:42:05
 File Status: NORMAL
 ID 60 S
 VI 0.020 vs. OC
 NP 756
 CR AUTO
 AR 8.415E+00
 OC -0.246

Pstat: VStat[] Ver 2
 FP -0.200 vs. OC
 IR NONE
 LS NO



Model 352/252 Corrosion Analysis Software, v. 2.01
 Filename: b1c22cpp10.dat
 Pstat: VStat[] Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 03-17-95

File Status: NORMAL
 Time Run: 09:42:05

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm²
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV <td>Step Time</td> <td>ST</td> <td>29.95</td>	Step Time	ST	29.95
No. of Points	NP	756				

Line Sync.	LS	no	GI Time Const.	TC	Off
Rise Time	RT	high stability	IR Mode	IR	none
Working Elec.	WE	Solid	Filter	FL	Off
Sample Area	AR	8.415	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	7.800	Equiv. Wt.	EW	0.0000 g
			Open Circuit	OC	-0.2460 V

Comment: C22 1000ppm Cl; 0.01M S2O3; pH 4

C22CPP11.DAT

Objective: To determine $E_p + E_{RP}$ of CP C22 in 1M Cl^- ; 0.01M $S_2O_3^{2-}$ @ pH 4 @ 95°C

Specimen: C22 immersed 1.719" ϕ 0.250"
 Solution: 1M Cl^- ; 0.01M $S_2O_3^{2-}$; pH 4
 Same solution made on p. 283

Temperature: 95°C H_2 thermometer #183303
 Sponge: 99.999% N_2 liquid carbonic tank #588637
 Potentiostat: Versastat SN 20104
 Data saved as C22CPP11.DAT
 Reference: SCE Fisher 13-620-51 SN 4280302

E_{can} -223 Keithly 614 SN 467374
 E_{pc} -164 mV " " " "

Solution deaerated 2 hrs. before start of test.

Start pH 4.010

End pH 5.443

Run parameter p. 290

Specimen a light "brassy" color. Solution still fairly clear
 Specimen does not appear to be pitted.

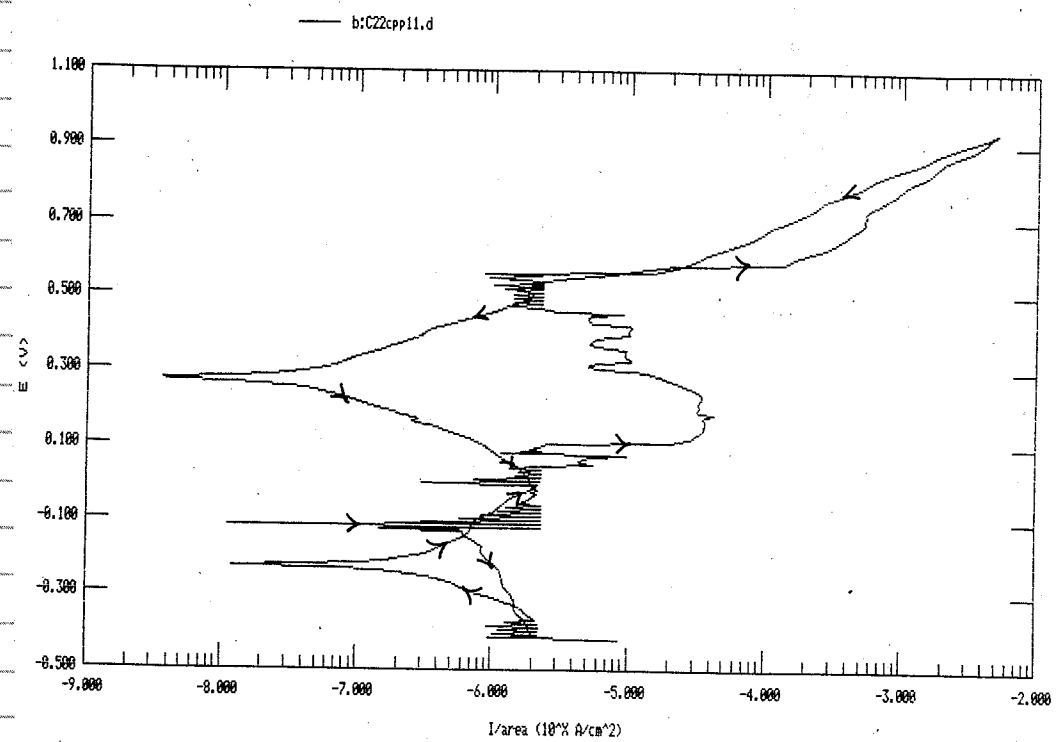
3/30/95

Walter J. Mochowski

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION
CP PASS vs. R CT PASS
SI 5.000E-03 SR 1.669E-04
FL NONE RT HIGH STABILITY
IT 4.493E-02 ITA 8.986E+00
Comment: C22 1M Cl; 0.01M S2O3; pH 4 95 C

File Status: NORMAL
Date Run: 03-20-95
Time Run: 09:58:16
IP -0.200 vs. OC
ID 60 S
ST 2.995E+01
REF 0.24150 SCE
EW 0.000E+00
DEN 7.800E+00

Pstat: VStat[] Ver 2
VI 0.020 vs. OC
HP 542
AR 0.986E+00
OC -0.218
FP -0.200 vs. OC
IR NONE
LS NO



Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: b:C22cpp11.dat
Pstat: VStat[] Ver 2
CP CYCLIC POLARIZATION
Date Run: 03-20-95
Time Run: 09:58:16
File Status: NORMAL

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm²
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	542					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.986	cm²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.2180	V

Comment: C22 1M Cl; 0.01M S2O3; pH 4 95 C

C22CPP12.DAT

Objective: To determine $E_p + E_{RP}$ of C22 in 4 molal Cl
@ pH 4 @ 95°C

Specimen: C22 immersed L 1.778" ϕ 0.248"

Solution: 4 molal Cl^- pH 4

187.2033g NaCl Fisher lot # 941616
800g H_2O
add 0.18ml 0.025M HCl lot FL 051290

Temperature: 95°C H_2 thermometer # 183503
Sponge w/ 99.999% N_2 liquid carbon tank # 588637
Potentiostat: Versastat SN 20104
data saved as C22CPP12.DAT

Reference: SCE Fisher 13-620-51 SN 4280302
Run parameter p.292

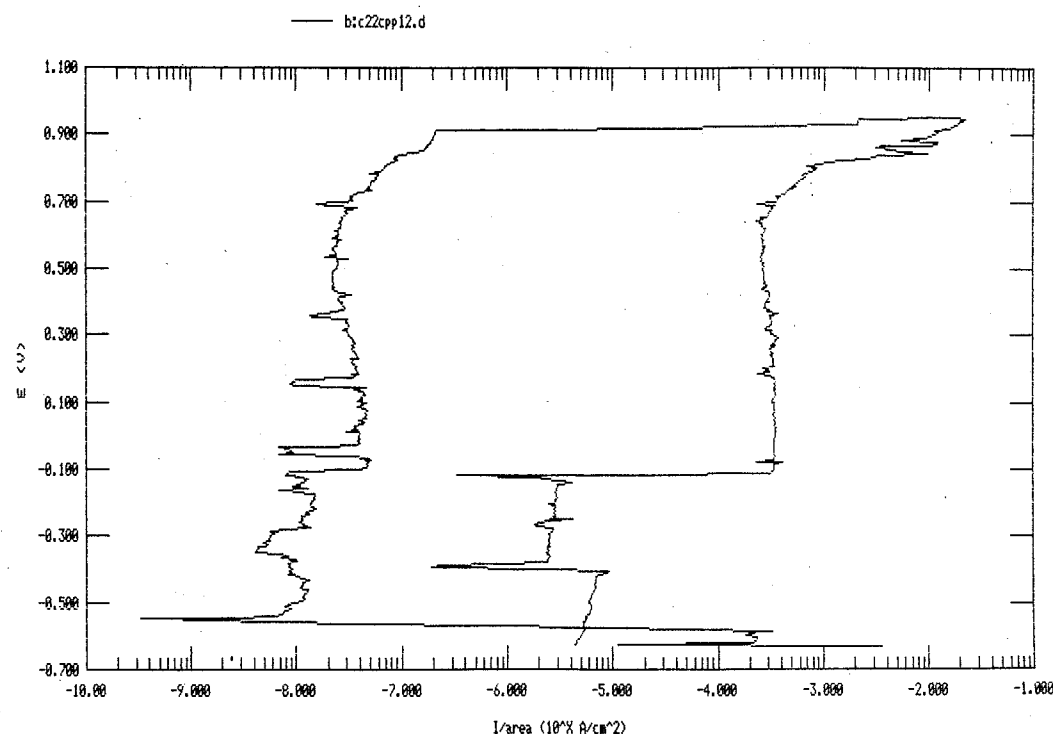
E_{can} -436mV Keithly 614 SN 467374
 E_{pc} +294mV " " " "

Solution deaerated for 2 hrs. before start of test.
Start pH 3.983
End pH 5.722

Specimen had a "brassy" film + maybe pite. Solution was greenish.

3/22/95
Walter J Macdonald

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 File Status: NORMAL
 Date Run: 03-21-95
 Time Run: 10:11:33
 Pstat: VStat[] Ver 2
 CP PASS vs. R CT PASS
 IP -0.200 vs. OC ID 60 S
 VI 0.020 vs. OC FP -0.200 vs. OC
 SI 5.000E-03 SR 1.669E-04 ST 2.995E+01 CR AUTO
 NP 632 IR NONE
 FL NONE RT HIGH STABILITY REF 0.24150 SCE
 HWK SOLID AR 8.938E+00 LS NO
 IT 4.469E-02 ITA 8.938E+00
 EN 0.000E+00 DEN 7.800E+00 OC -0.429
 Comment: C22 4 Molal Cl; pH 4; 95 C



Model 352/252 Corrosion Analysis Software, v. 2.01
 Filename: bic22cpp12.dat
 Pstat: VStat[] Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 03-21-95
 File Status: NORMAL
 Time Run: 10:11:33

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.000E-3	A/cm^2
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95 s
No. of Points	NP	632				

Line Sync.	LS	no		GI Time Const.	TC	Off
Rise Time	RT	high stability		IR Mode	IR	none
Working Elec.	WE	Solid		Filter	FL	Off
Sample Area	AR	8.938	cm^2	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000 g
				Open Circuit	OC	-0.4290 V

Comment: C22 4 Molal Cl; pH 4; 95 C

C22CPP13.DAT

Objective: To determine $E_p + E_{Rp}$ of C22 in 4 molal Cl^- at pH 1.0 at 95°C

Specimen: C22 immersed L 1.773" ϕ 0.249"
 0.0249"
 102 machined 3/23/95

Solution: 4 molal Cl^- pH 1.0
 187.1976 g NaCl Fisher Cat # 941616
 800 g H_2O
 pH adjusted with 1.85 ml HCl lot FL051290
 and ~.2 ml of conc HCl

Temperature: 95°C H_2 thermometer # 183303
 Sparge w/ 99.999% N_2 liquid carbonic tank # 588637
 Potentiostat: Versastat SA 20104
 Data saved as C22CPP13.DAT

Reference: SCE Fisher 13-620-51 SN 45F0305

Run parameters p. 294

E_{can} -120 mV Keithly 614 SN 467324
 E_{pt} +604 mV " " " "

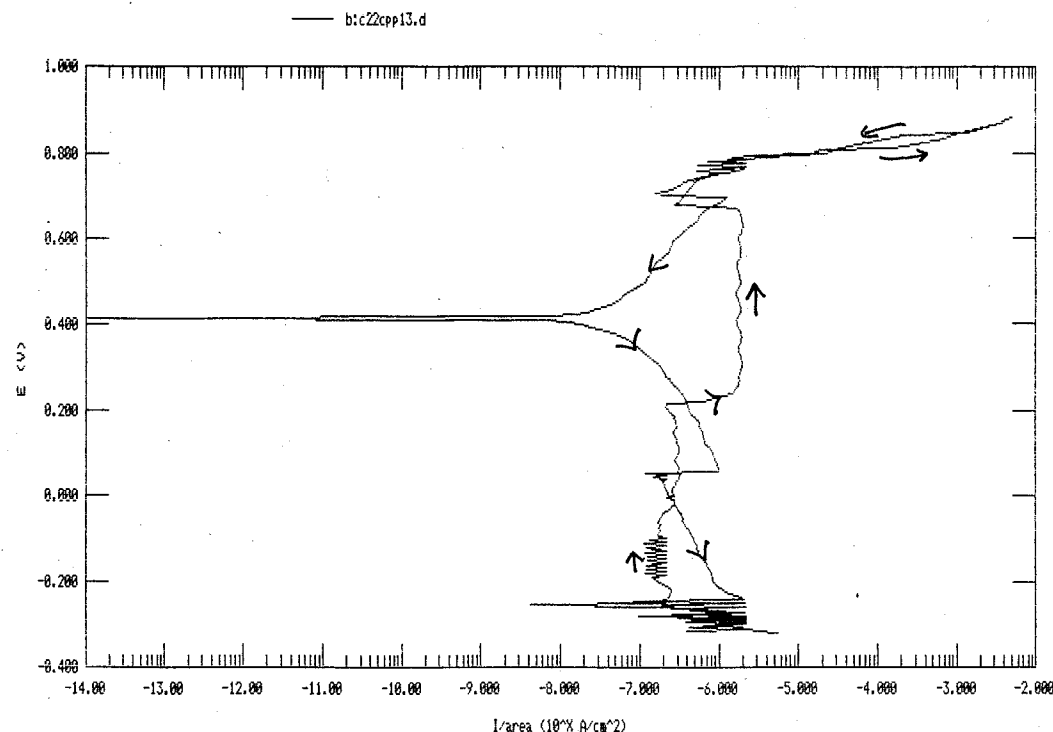
Solution deaerated for 2 hrs. before start of test.
 Start pH 1.052
 End pH 1.285

Specimen still shiny & polished. Solution water clear.

3/27/95

Walter J. Marchowski

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04 IP -0.200 vs. OC ID 60 S VI 0.020 vs. OC FP -0.200 vs. OC
 FL NONE RT HIGH STABILITY REF 0.24150 SCE CR AUTO NP 400 IR NONE
 IT 4.020E-02 ITA 9.203E+00 EM 0.000E+00 DEM 7.000E+00 OC -0.120 LS NO
 Comment: C22 4 molal Cl; pH 1 at 95 C



Model 352/252 Corrosion Analysis Software, v. 2.01
 Filename: b:c22cpp13.dat
 Pstat: VStat[] Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 03-23-95

File Status: NORMAL
 Time Run: 10:29:07

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.001E-3	A/cm ²
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	400					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	9.255	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.1200	V

Comment: C22 4 molal Cl; pH 1 at 95 C

C22CPP14.DAT

Objective: To determine E_p & E_{RP} of C22 in 4 molal Cl^- at pH 9.0 at 95°C

Specimen: C-22 immersed $l = 1.764''$ $\phi = 0.248''$

Solution: 4 molal Cl^- pH 9.0
 187.1914 g NaCl Fisher lot # 941616
 800 g H_2O
 pH adjusted w/ 0.18 ml 0.1M NaOH lot # 883164

Temperature: 95°C H_2 thermometer #183303
 Sponge w/ 99.999% N_2 liquid carbonic tank # 588637

Potentiostat: Versastat SN 20104

Data saved as C22CPP14.DAT

Reference: SCE Fisher 13-620-51 SN 4280302
 Run parameters p.296

$E_{can} -622mV$ Keithly 614 SN 467374
 $E_{PE} -73mV$ " " " "

Start pH 9.008
 End pH 7.176

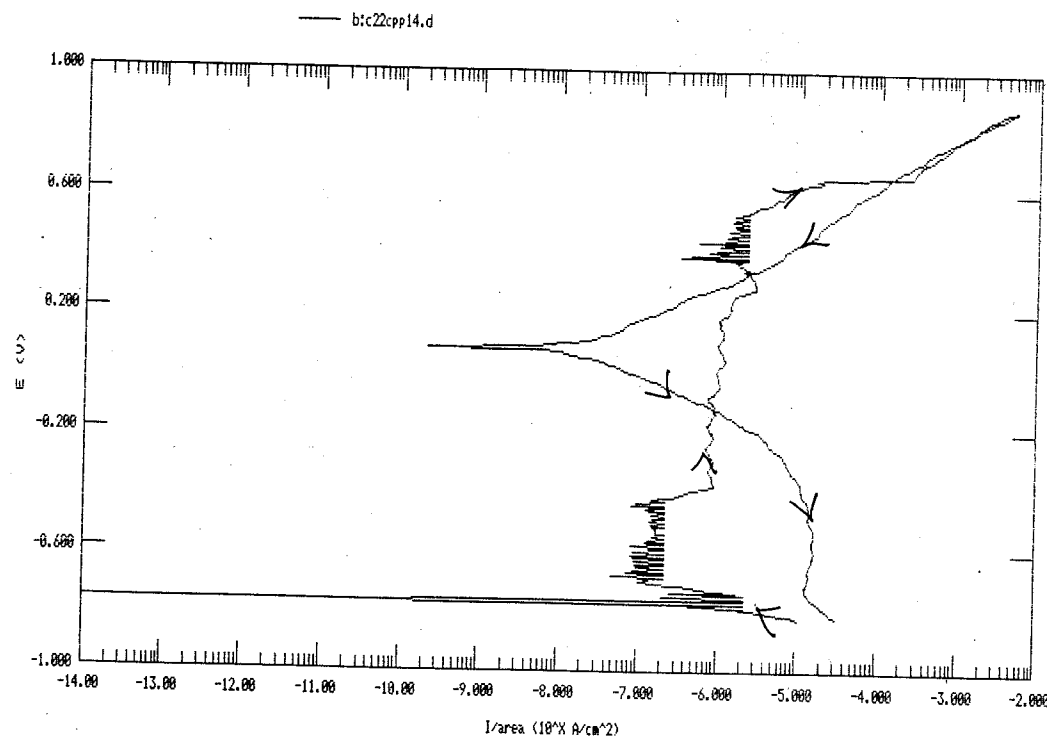
Specimen deaerated for 2 hours before start of test.
 Specimen "stained" - no apparent pitting. Solution a slight yellowish color.

5/28/95
 Walter J. Marchinski

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04
 FL NONE RT HIGH STABILITY
 IT 4.591E-02 ITR 9.181E+00
 Comment: C22 4 molal Cl; pH 9; 95C

Filename: b1c22cpp14.dat
 Date Run: 03-27-95 Time Run: 10:22:22
 File Status: NORMAL
 IP -0.200 vs. OC ID 60 S
 ST 2.995E+01 CR AUTO
 REF 0.24150 SCE
 EW 0.000E+00
 DEH 7.800E+00
 OC -0.623

Pstat: VStat[] Ver 2
 VI 0.020 vs. OC
 NP 682
 AR 9.181E+00
 FP -0.200 vs. OC
 IR NONE
 LS NO



Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: b1c22cpp14.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 03-27-95

File Status: NORMAL

Time Run: 10:22:22

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.001E-3	A/cm ²
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95 s
No. of Points	NP	682				
Line Sync.	LS	no		GI Time Const.	TC	Off
Rise Time	RT	high stability		IR Mode	IR	none
Working Elec.	WE	Solid		Filter	FL	Off
Sample Area	AR	9.181	cm ²	Ref. Elec.	RE	SCE 0.2415 V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000 g
				Open Circuit	OC	-0.6230 V

Comment: C22 4 molal Cl; pH 9; 95C

825CPP15.DAT

Objective: To determine $E_p + E_{RP}$ of 825 in 4 molal Cl^- at pH 9.0 @ 95°C.

Specimen: 825 Lot # HH 4371FC
 immersed $L = 1.611"$ $\phi = 0.249"$

Solution: 4 molal Cl^- pH 9.0
 187.2132g NaCl Fisher lot # 941616
 800g water
 pH adjusted w/ 0.1M NaOH lot # 883164 (lost track of amount but approx 4-5 ml)

Temperature: 95°C Hg thermometer #183303

Sponge w/ 99.999% N_2 liquid carbonic tank #588637

Potentiostat: Versastat SN 20104

Reference: SCE Fisher 13-620-51 SN 4380302

E_{com} -653 Keithly 614 SN 467374

E_{pt} -96 mV " " " "

Solution deaerated 2 hrs. before start of test.

Start pH 9.002 End pH 8.340

Specimen pitted. Solution has a purplish ppt.

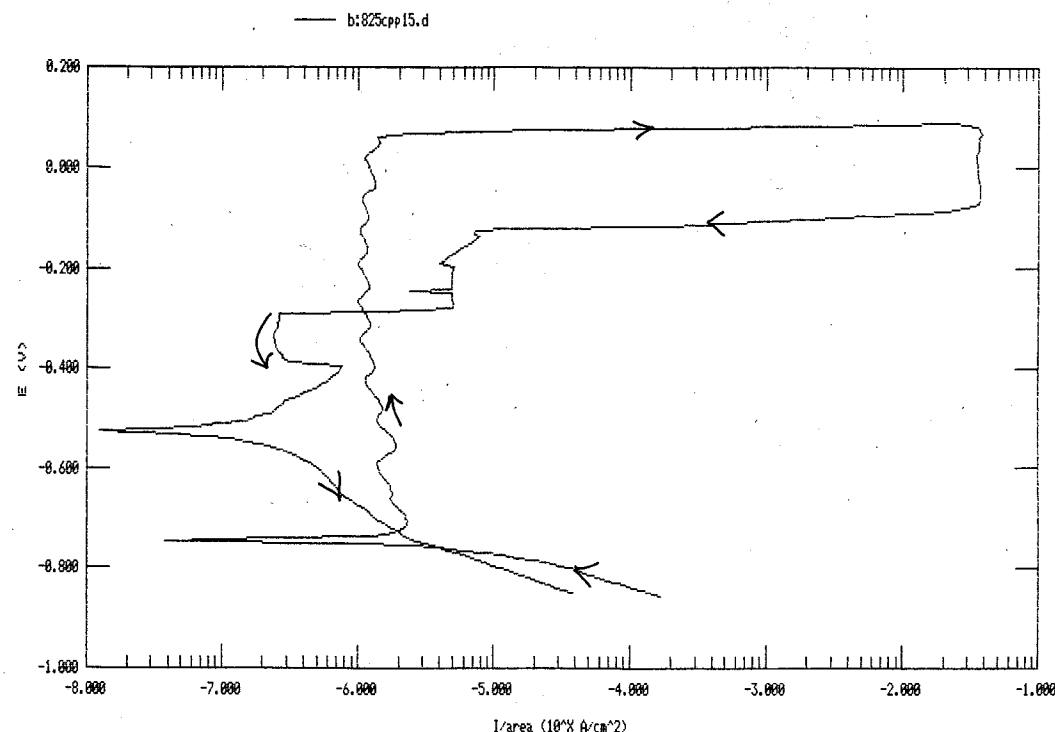
Saved as 825CPP15.DAT

Run parameters on p. 298

3/28/95

Walter J. Macchowski

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 CP PASS vs. R CT PASS
 SI 5.000E-03 SR 1.669E-04 IP -0.200 vs. OC ID 60 S VI 0.020 vs. OC FP -0.200 vs. OC
 FL NONE RT HIGH STABILITY REF 0.24150 SCE CR AUTO NP 378 IR NONE
 IT 4.217E-02 ITR 8.439E+000 AR 8.439E+000 LS NO
 Comment: 825 4 molal Cl; pH 9; 95 C



Model 352/252 Corrosion Analysis Software, v. 2.01

Filename: b:825cpp15.dat

Pstat: VStat[] Ver 2

CP CYCLIC POLARIZATION

Date Run: 03-28-95

File Status: NORMAL

Time Run: 10:11:31

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	4.999E-3	A/cm ²
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95
No. of Points	NP	378				s

Line Sync.	LS	no	GI Time Const.	TC	Off
Rise Time	RT	high stability	IR Mode	IR	none
Working Elec.	WE	Solid	Filter	FL	Off
Sample Area	AR	8.439	Ref. Elec.	RE	SCE 0.2415
Density	DE	7.800	Equiv. Wt.	EW	0.0000
		g/ml	Open Circuit	OC	-0.6550

Comment: 825 4 molal Cl; pH 9; 95 C

825CPP16.DAT

Objective: To determine E_p & E_{Rp} of 825 in 4 molal Cl^- at pH 4.0 at 95°C.

Specimen: 825 Lot # HH4371FG
 immersed $l = 1.356"$ $\phi = 0.250"$

Solution: 4 molal Cl^- pH 4.0
 187.1990 g NaCl Fisher Lot # 941616
 adj w/ 3 drops conc HCl
 pH 3.962

Temperature: 95°C Hg thermometer #183303

Sponge w/ 99.999% N_2 liquid carbonic tank #588637

Potentiostat: Versastat SN 20104

Reference: SCE Fisher 13-620-51 SN 4280302

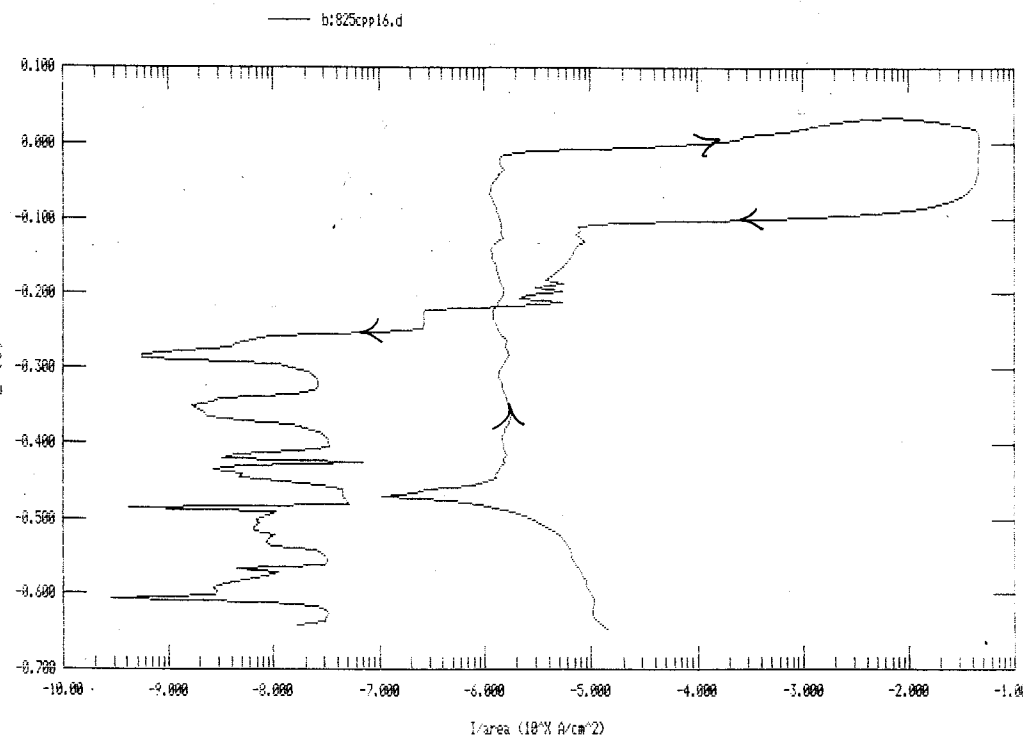
$E_{can} -444 mV$ Keithly 614 SN 467374
 $E_{pc} -65 mV$ " " " "

Start pH 3.962 End pH 8.642

Specimen deaerated 2 hrs. before start of test.
 Specimen has pits. Solution has dark ppt.
 Run parameters p.300
 Data saved as 825CPP16.DAT

3/29/95
 Walter J. Mochowski

Model 352/252 Corrosion Analysis Software, v. 2.01
 CP CYCLIC POLARIZATION
 File Status: NORMAL
 Date Run: 03-29-95 Time Run: 10:19:33
 Pstat: VStat[] Ver 2
 Cond. Time CT PASS s Initial Pot. IP -0.200 vs. OC V oc
 Cond. Pot. CP PASS V Vertex 1 Pot. VI 20.00E-3 V oc
 Initial Delay ID 60 s I Threshold IT 4.999E-3 A/cm²
 Final Pot. FP -0.2000 V oc
 Scan Rate SR 0.1669 mV/s Curr. Range CR Auto
 Scan Incr. SI 5.000 mV Step Time ST 29.95 s
 No. of Points NP 272
 Line Sync. LS no GI Time Const. TC Off
 Rise Time RT high stability IR Mode IR none
 Working Elec. WE Solid Filter FL Off
 Sample Area AR 7.187 cm² Ref. Elec. RE SCE 0.2415 V
 Density DE 8.140 g/ml Equiv. Wt. EW 0.0000 g
 Open Circuit OC -0.4460 V
 Comment: 825 4 molal Cl; pH 4; 95 C



Model 352/252 Corrosion Analysis Software, v. 2.01
 Filename: b:825cp16.dat
 Pstat: VStat[] Ver 2
 CP CYCLIC POLARIZATION
 Date Run: 03-29-95
 File Status: NORMAL
 Time Run: 10:19:33

Cond. Time	CT	PASS	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	PASS	V	Vertex 1 Pot.	VI	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	4.999E-3	A/cm ²
				Final Pot.	FP	-0.2000	V oc
Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	272					
Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	7.187	cm ²	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	8.140	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.4460	V

Comment: 825 4 molal Cl; pH 4; 95 C

825CPP17.DAT

Objective: To determine E_p + E_{RP} of 825 in 4 molal Cl^- at pH 1.0 at 95°C

Specimen: 825 test # HH 4371 FG

immersed $l =$ $\phi =$

Solution: 4 molal Cl^- pH 1.0

187.2082 g NaCl Fisher lot # 941616

adj w/ 0.20 ml conc HCl pH 1.015

Temperature: 95°C Hg thermometer # 183303

Sparge w/ 99.999% N_2 liquid carbonic tank # 588637

Potentiostat: Versastat SN 20104

Reference: SCE Fisher 13-620-51 SN 4280302

$E_{con} = -335$ mV Keithly 614 SN 467374
 $E_{pt} = -209$ mV " " " "

Start pH 1.015 End pH 1.097
 Solution deaerated 2 hours before start of test.

Specimen stained + has golden color. No apparent pits.

Solution a bright yellow.

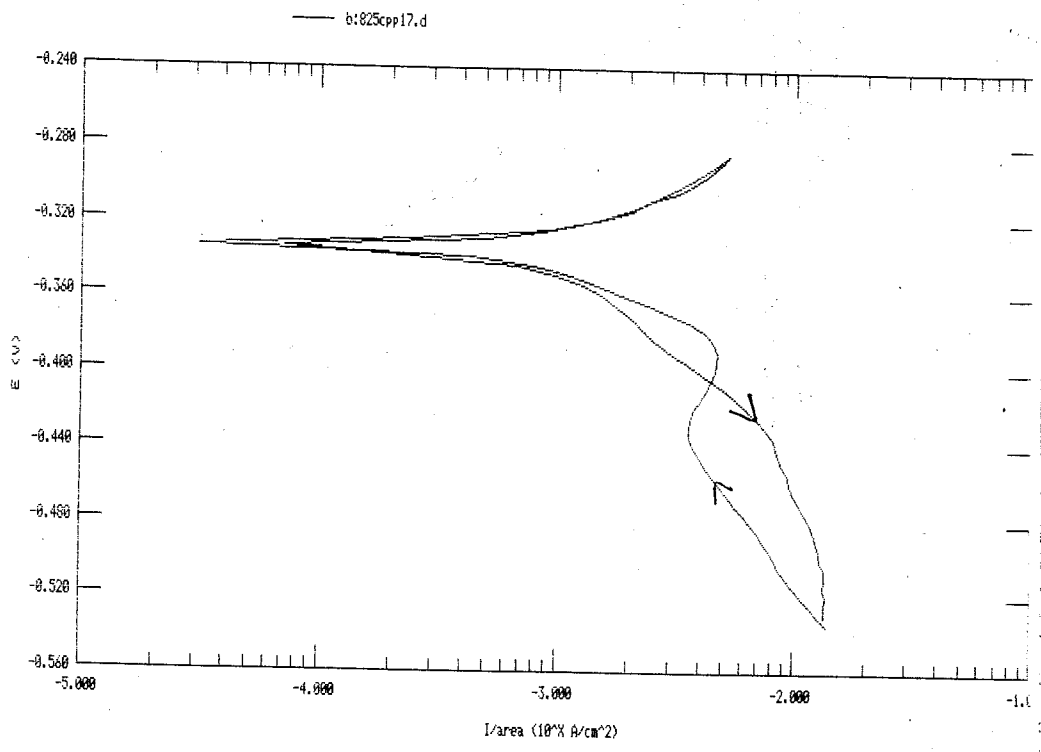
Saved as 825CPP17.DAT

Parameter on p. 302

3/31/95

Walter J. MacKowski

Model 352/252 Corrosion Analysis Software, v. 2.01
CP CYCLIC POLARIZATION
File Status: NORMAL
Date Run: 03-30-95
Time Run: 10:26:20
Pstat: VStat() Ver 2
IP -0.200 vs. OC
ID 60'S
V1 0.020 vs. OC
FP -0.200 vs. OC
SI 5.000E-03
SR 1.669E-04
ST 2.995E+01
CR AUTO
HP 100
IR NONE
FL NONE
RT HIGH STABILITY
REF 0.24150 SCE
ARK SOLID
AR 8.685E+00
LS NO
IT 4.343E-02
ITA 8.685E+00
EW 0.000E+00
DEN 7.800E+00
OC -0.335
Comment: 825 4 molal Cl; pH 1; 95 C



Model 352/252 Corrosion Analysis Software, v. 2.01
Filename: b:825cpp17.dat
Pstat: VStat() Ver 2
CP CYCLIC POLARIZATION
Date Run: 03-30-95
File Status: NORMAL
Time Run: 10:26:20

Cond. Time	CT	pass	s	Initial Pot.	IP	-0.2000	V oc
Cond. Pot.	CP	pass	V	Vertex 1 Pot.	V1	20.00E-3	V oc
Initial Delay	ID	60	s	I Threshold	IT	5.001E-3	A/cm^2
				Final Pot.	FP	-0.2000	V oc

Scan Rate	SR	0.1669	mV/s	Curr. Range	CR	Auto	
Scan Incr.	SI	5.000	mV	Step Time	ST	29.95	s
No. of Points	NP	100					

Line Sync.	LS	no		GI Time Const.	TC	Off	
Rise Time	RT	high stability		IR Mode	IR	none	
Working Elec.	WE	Solid		Filter	FL	Off	
Sample Area	AR	8.685	cm^2	Ref. Elec.	RE	SCE 0.2415	V
Density	DE	7.800	g/ml	Equiv. Wt.	EW	0.0000	g
				Open Circuit	OC	-0.3350	V

Comment: 825 4 molal Cl; pH 1; 95 C

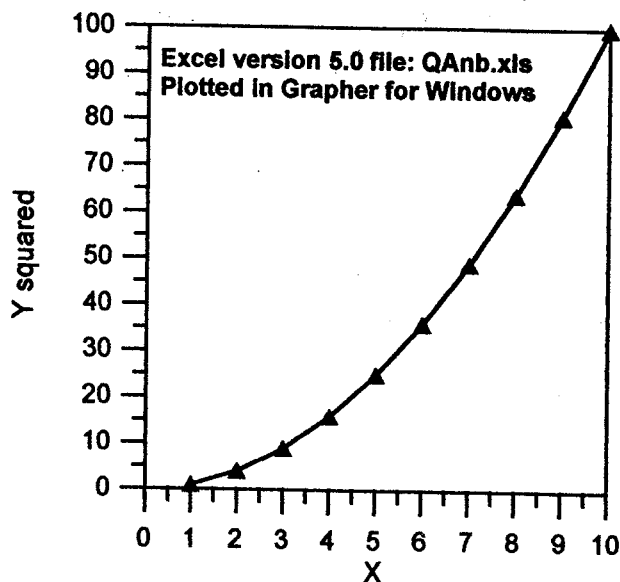
I have reviewed this scientific notebook and find it in compliance with QAP-001. There is sufficient information regarding procedures used for conducting tests, acquiring and analyzing data so that another qualified individual could repeat the activity.

N. Snickel

2/14/97

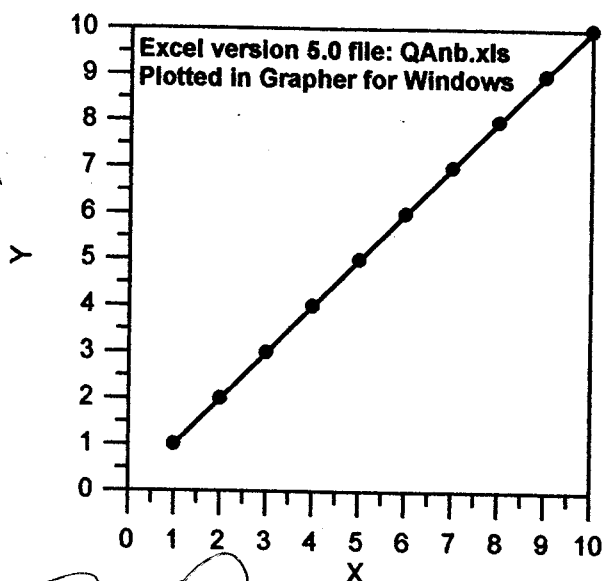
The project has been closed & the scientific notebook is turned in as Q.A. records.

INSTALLATION TEST DOCUMENTATION FOR MICROSOFT EXCEL VERSION 5.0 AND GRAPHER FOR WINDOWS 1.23



X	Y	Ysquared
1	1	1
2	2	4
3	3	9
4	4	16
5	5	25
6	6	36
7	7	49
8	8	64
9	9	81
10	10	100

David D 4/1/97



David D 4/1/97

David D 4/1/97

ADDITIONAL INFORMATION FOR SCIENTIFIC NOTEBOOK #: 045

Document Date:	06/03/1992
Availability:	Southwest Research Institute® Center for Nuclear Waste Regulatory Analyses 6220 Culebra Road San Antonio, Texas 78228
Contact:	Southwest Research Institute® Center for Nuclear Waste Regulatory Analyses 6220 Culebra Road San Antonio, TX 78228-5166 Attn.: Director of Administration 210.522.5054
Data Sensitivity:	<input checked="" type="checkbox"/> "Non-Sensitive" <input type="checkbox"/> Sensitive <input type="checkbox"/> "Non-Sensitive - Copyright" <input type="checkbox"/> Sensitive - Copyright
Date Generated:	1992 through 1997
Operating System: (including version number)	DOS
Application Used: (including version number)	EG&G 342C
Media Type: (CDs, 3 1/2, 5 1/4 disks, etc.)	2 - 3 1/2 disks
File Types: (.exe, .bat, .zip, etc.)	dat, binary
Remarks: (computer runs, etc.)	Media contains: corrosion data files