Author
Jon Zbasnik

Department
Mechanical Engineering

Date
February 12, 2004

Project: LHC IR Feedbox
Vapor-Cooled Current Leads; LBNL PO 6703387

Title: Vendor Test Data; Operational Recommendations

1. INTRODUCTION

LBNL Subcontract 6703887 was placed with American Magnetics, Inc. (AMI) on December 19, 2002. The contract was for engineering design, fabrication, and full-current testing of vapor-cooled current lead assemblies for the DFBX. The leads were to be designed and fabricated in accordance with LBNL specification M981A. This note provides a synopsis of the AMI full-current test results and provides recommended operating points when they are used in LHC operations.

Each DFBX requires the following vapor-cooled lead assemblies:

- One assembly containing 10 leads each with a current rating of 120 A
- Two assemblies containing 6 leads each with a current rating of 600 A
- One assembly containing 2 leads each with a current rating of 600A.

The contract required current lead assemblies for 8 DFBX. The leads produced by AMI have the following serial numbers. The serial number nWmmddX is interpreted as follows: n = last digit of production year, mm = month of production, dd = date of production. For X, A = 10 lead 120 A; B & C = 6 lead 600 A, and D = 2 lead 600 A assembly.

3W0731A, 3W0731B, 3W0731C, 3W0731D
3W0825A, 3W0825B, 3W0825C, 3W0825D
3W00909A, 3W0909B, 3W0909C, 3W0909D
3W1111A, 3W1111B, 3W1111C, 3W1111D
3W1118A, 3W1118B, 3W1118C, 3W1118D
3W1125A, 3W1125B, 3W1125C, 3W1125D
4W0113A, 4W0113B, 4W0113C, 4W0113D
4W0116A, 4W0116B, 4W0116C, 4W0116D

2. TESTING PROCEDURE

The AMI testing procedure was developed with general guidance provided by LBNL. All assemblies were subjected to: dimensional checks of critical features, pressure tests, leak tests, voltage holding tests, and full-current tests. The AMI test Plan is presented in Appendix A.

The full-current tests were performed on completed assemblies with the leads connected in series so all leads were powered simultaneously. The cold end connections were made using CERN corrector bus wire (LHC-DSCC-CI-0001) securely clamped to the lead bus bars.

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A visit was made to AMI on Nov 4 & 5, 2003 to witness the testing procedure, develop a standardized full-current test procedure, and develop acceptance criteria. The trip report from this visit is presented in Appendix B.

3. FULL-CURRENT TEST RESULTS

The test data submitted by AMI demonstrated that all leads are acceptable. Generally, the test data for each assembly included full-current lead voltage drop as a function of time and liquid level as a function of time. All boiloff flow was generally taken through the leads, and the flow rates were manually balanced using rotameter flow meters to obtain approximately equal flows through each lead in the assembly. The test data can be found in Appendix C.

4. OPERATIONAL RECOMMENDATIONS

4.1 Coolant Flow

Figures 4.1-1 through 4.1-3 shows the AMI median lead voltage drop vs. lead coolant flow and an indicated recommended operating point for operations in the LHC at CERN. In the figures, the values of coolant flow are determined by assuming all the helium boiloff is equally divided between leads in the assembly. The corresponding voltages are the median values of measured voltage drops, when the liquid helium level in the AMI test dewar is approximately at the point it would be during LHC operation.

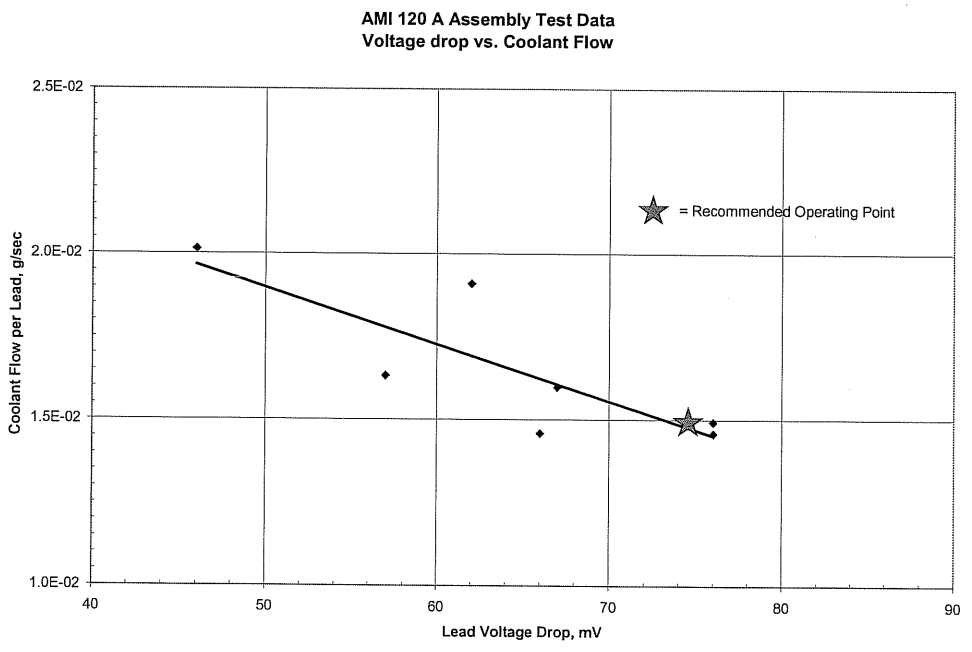

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Figure 4.1-1. Voltage drop as a function of coolant flow for the AMI 120 A 10-lead assembly. See above for an explanation of the data.

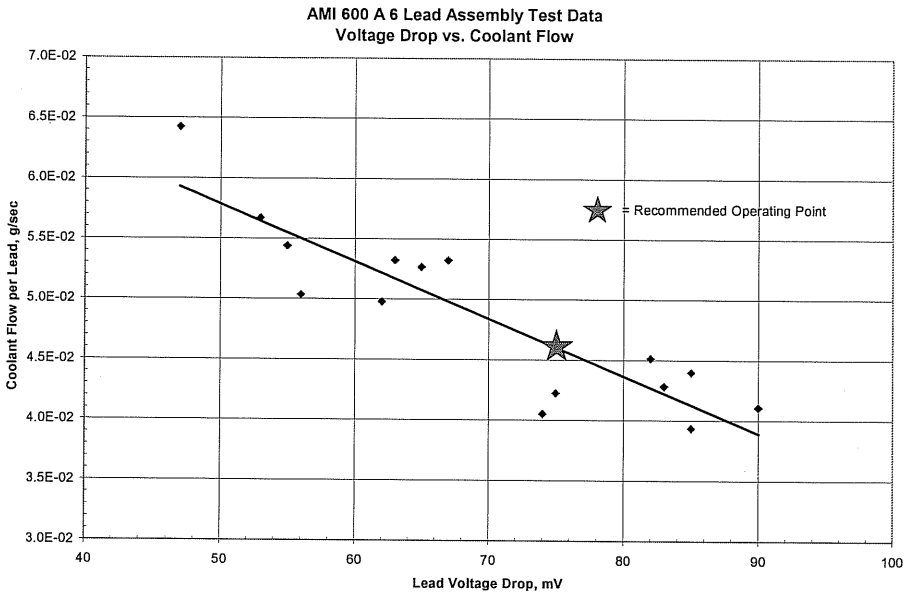

Figure 4.1-2. Voltage drop as a function of coolant flow for the AMI 600 A 6-lead assembly. See above for an explanation of the data.

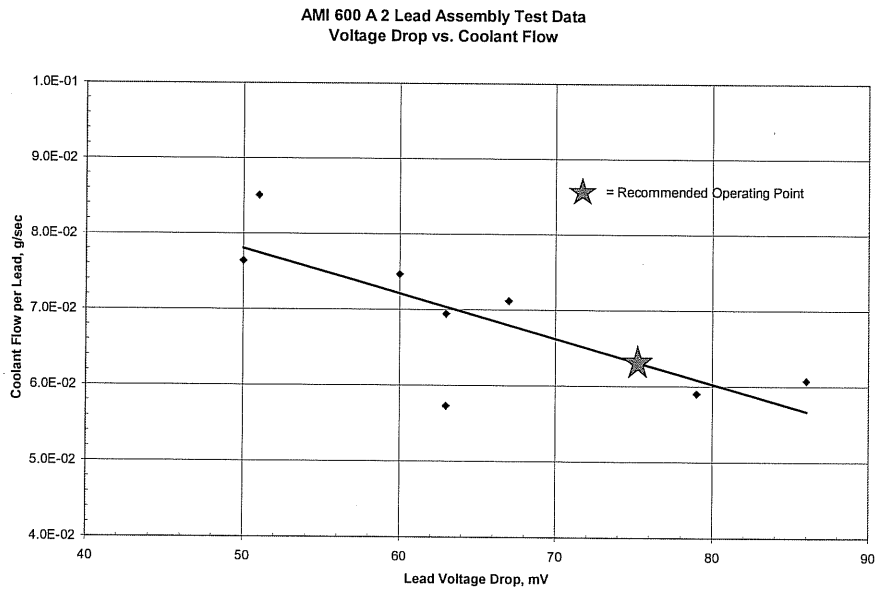

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Figure 4.1-3. Voltage drop as a function of coolant flow for the AMI 600 A 2-lead assembly. See above for an explanation of the data.
The recommended operating points are indicated on these figures. These represent values that CERN can use in planning and initial setups.

We therefore suggest that CERN use the following helium flow rates for the DFBX current leads.

120 A -10 lead Assembly, DFLZ: 1.5×10^{-2} g/s
600 A - 6 lead Assembly, DFLY: 4.7×10^{-2} g/s
600 A - 2 lead Assembly, DFLY: 6.4×10^{-2} g/s.

We have the unexpected result that the assembly of 2-600 A leads requires more flow than the assembly of 6-600 A leads. This is probably due a difference in thermal gradient along the leads in the 2 cases.

The required lead packaging results in a required coolant flow that is larger then expected based on AMI historical experience. For the 600 A - 6 lead assembly the increase is about 40% and for the other assemblies it is approximately double the historical value. This is likely a result of the additional insulating material surrounding the current leads which is not a feature of the standard AMI current lead design.

4.2 Quench Detection Threshold Settings

Based on their testing experience and other measurements, AMI recommend that the quench detection thresholds be set as follows:

120 A Leads: 100 mV
600 A Leads: 130 mV.

4.3 Allowable Loads

The LBNL Specification inadvertently omitted a requirement for the allowable load that can be applied to the top of the current lead by power cables and their installation. As a supplement to the LBNL specification, AMI provided the following load limits:

120 A Leads: 9 lbf (40 N)
600 A Leads: 45 lbf (200 N).

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APPENDIX A

LBNL Current Lead Test Plan
American Magnetics, Inc.

Introduction

This document describes the various tests to be performed on the LBNL Current Leads to meet the requirements of LBNL Specification LH2000 "600 A and 120A Vapor Cooled Current Lead Assemblies for the LHC Interation Region Feedboxes (DFBX)." These tests will be performed at American Magnetics, Inc. (AMI) upon completion of construction and prior to shipment of the lead assemblies

Test Equipment

The following items will be required for proper execution of the required tests:

- Modified test vessel for leak check, pressure, and 2000 V "in air" voltage isolation (Hipot) testing. An adapter flange will be fitted to the test vessel to interface with the current lead cluster Conflat flange and will include a 6" OD x 28" long tube (coaxial to the lead cluster) to simulate the actual current lead installation.
- 9" test dewar for 600 V voltage isolation and full current tests. An adapter flange will be fitted to the test dewar to interface with the current lead cluster Conflat flange and will include a 6" OD x 28" long tube (coaxial to the lead cluster) to simulate the actual current lead installation.
- Torotron 4 kV Hipot tester
- Alcatel ASM 10 leak checker
- Current source power supply cabinet and control system
- LHe level meter
- Vacuum hose and associated valves
- Leak check gas cylinder (GHe)
- Pressure test hose and associated valves and gauges
- Pressure test gas cylinder (GN2)
- Liquid Helium
- Liquid Nitrogen (for test dewar precooling)
- Current source busbars and leads
- Jumpers for connecting lead pairs in series
- Current Lead Test Data Sheets

Test Procedures

I The following tests shall be conducted by the Mechanical Division. Upon completion of the dimensional checks, jumpers will be installed on the warm end conductors and the cold end bus bars. These jumpers will be installed so that the lead pairs

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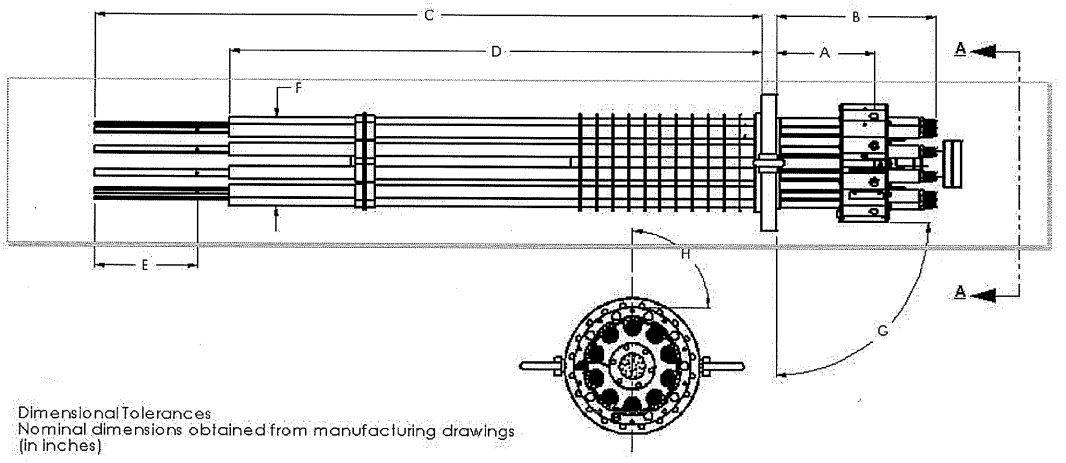
will be connected electrically in series. The current lead assembly will then be installed in the test vessel for leak check, pressure test and voltage isolation (Hipot) testing

1. Dimensional Checks of Completed Assembly

This test will be performed to determine the dimensional accuracy of the current lead assembly structure.

1.1 Check the full assembly for specific dimensions as specified by the customer.
1.2 Specific dimensions are illustrated in Figure 1.
1.3 Record dimensions on associated Current Lead Test Data Sheet

Figure 1
Dimensional Check



Dimensional Tolerances
Nominal dimensions obtained from manufacturing drawings
(in inches)

A (Top of flange to power cable connection) - Nominal +/- .10"
B (Top of flange to cooling gas outlets) - Nominal +/- .10"
C (Bottom of flange to end of busbar) - Nominal +/- .10"
D (Bottom of flange to end of G-10 insulating tube - Nominal +/- .10"
E (Bottom of busbar to voltage tap hole) - Nominal +/- .10"
F (Lead envelope outer diameter) - < 5.15 for 120 Amp lead < 5.10 for 600 Amp lead
G (Datum to conductor face orientation) - Perpendicular +/- XX
H (Datum to conductor face orientation) - Perpendicular +/- XX

2. Leak Test of Completed Lead Assembly

(Verification of current lead specification section 3.10)
This test will be performed to determine the location and severity of any potential leaks in the current lead assembly.

2.1 Install the current lead assembly into the test vessel as per Figure 2.
2.2 Connect the vacuum pump/leak checker apparatus as illustrated.
2.3 Vacuum pump the assembly.
2.4 Leak check the assembly to less than 1 x 10^{-8} std. cc/sec by applying helium gas to the upper end of the lead assembly.
2.5 Record Pass/Fail and leak rate on associated Current Lead Test Data Sheet
2.6 Slowly vent the test vessel to atmospheric pressure.

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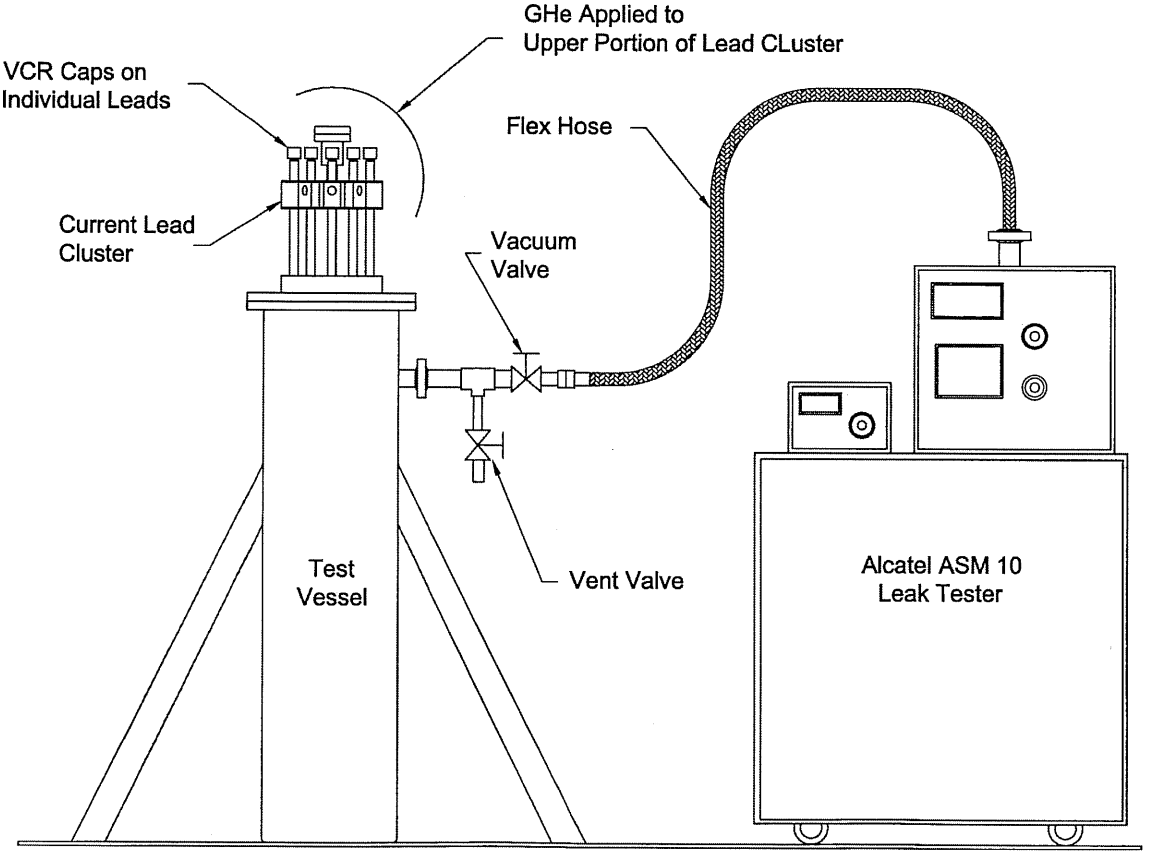
2.7 Remove the leak check equipment from the test vessel.

Figure 2
Leak Test Setup



3. Pressure Test

(Verification of current lead specification section 3.9)

This test will be performed to determine the structural integrity of the current lead assembly. Leaks will be determined in the leak checking test.

3.1 Install pressure test equipment on the test vessel as illustrated in Figure 3.
3.2 Slowly raise the vessel pressure to 50 psig (3.4 bar gage).
3.3 Hold pressure for 5 minutes and check for degradation.
3.4 Record Pass/Fail on associated Current Lead Test Data Sheet.
3.5 Slowly reduce vessel pressure to atmospheric through the vent valve.

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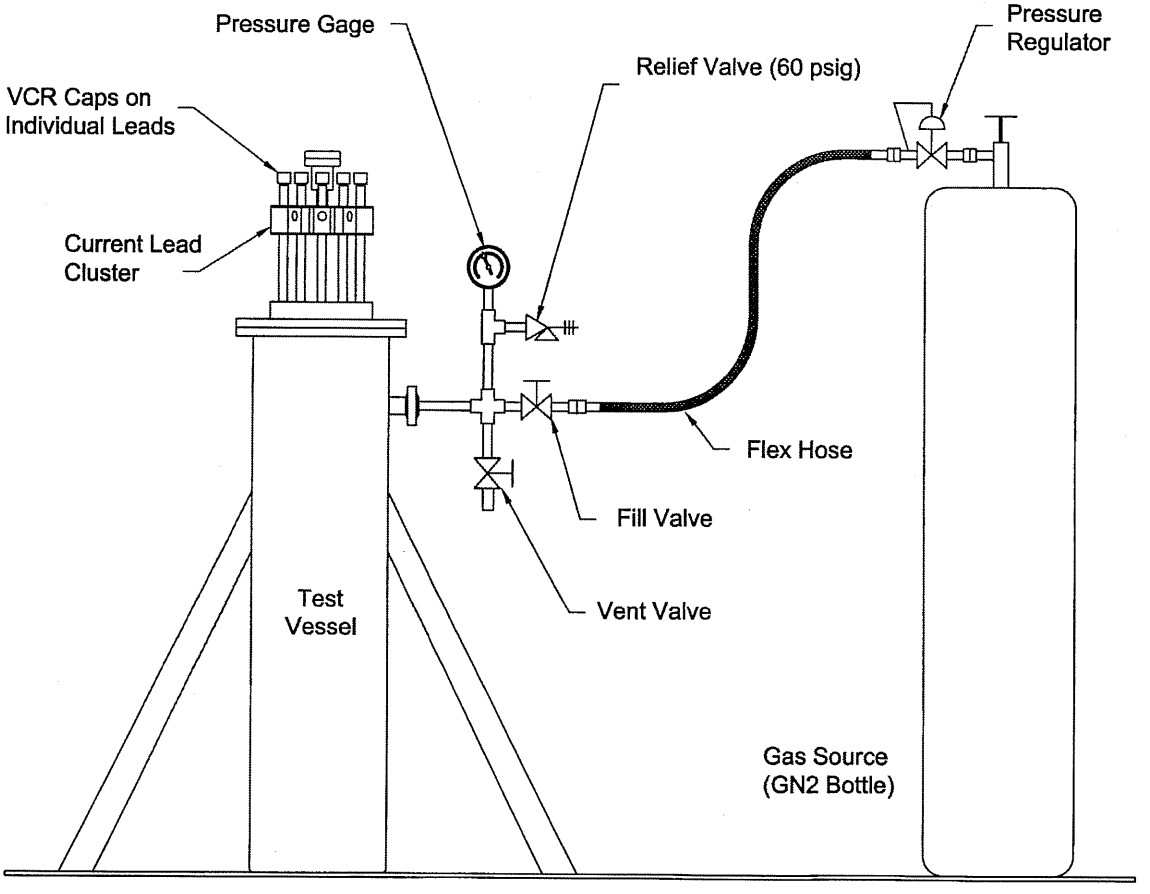
Figure 3
Pressure Test Setup



4. **Voltage Isolation (Hipot) Testing in Air**

(Verification of current lead specification section 3.3)

This test will be performed to determine the voltage isolation integrity of the current lead assembly while at ambient temperature in air.

4.1 Vent the test vessel to air by removing flex hose.
4.2 Install Hipot equipment to the current lead and test vessel as illustrated in Figure 4.
4.3 Hipot test the current lead assembly per AMI Hipot procedure TP-HIPOT.
4.4 Record Pass/Fail on associated Current Lead Test Data Sheet.
4.5 Remove the Hipot equipment from the test vessel.

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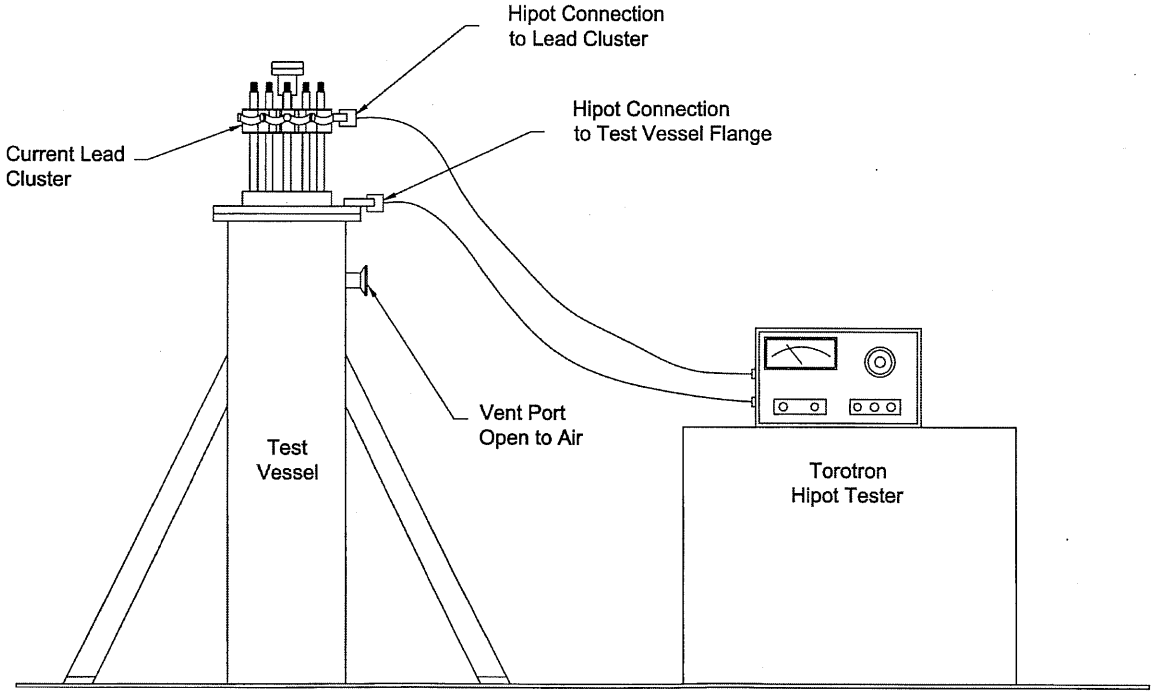
Figure 4
Hipot Test in Air
Test Setup



II The following tests shall be conducted by the Magnet Division. The current lead cluster (with jumpers remaining installed) will be installed in the test dewar for voltage isolation (Hipot) and full current testing.

5. Voltage Isolation (Hipot) Testing in Dewar
(Verification of current lead specification section 3.3)
This test will be performed to determine the voltage isolation integrity of the current lead assembly while in a helium environment at liquid helium temperature.

5.1 Cool down test dewar with liquid nitrogen.
5.2 Drain liquid nitrogen from test dewar.
5.3 Install the current lead assembly in the test dewar as illustrated in Figure 5.
5.4 Fill the test dewar to TBD % with liquid helium (sufficient to cover the lower portions of the busbars).
5.5 Install the Hipot equipment on the current lead and test dewar as illustrated in Figure 5.
5.6 Allow the test dewar pressure to increase to 4 psig (1.3 bara) via the relief valve.
5.7 Hold until pressure stabilizes.
5.8 Hipot test the current lead assembly per AMI Hipot procedure TP-HIPOT.
5.9 Record Pass/Fail on associated Current Lead Test Data Sheet.
5.10 Remove the Hipot equipment from the test dewar.

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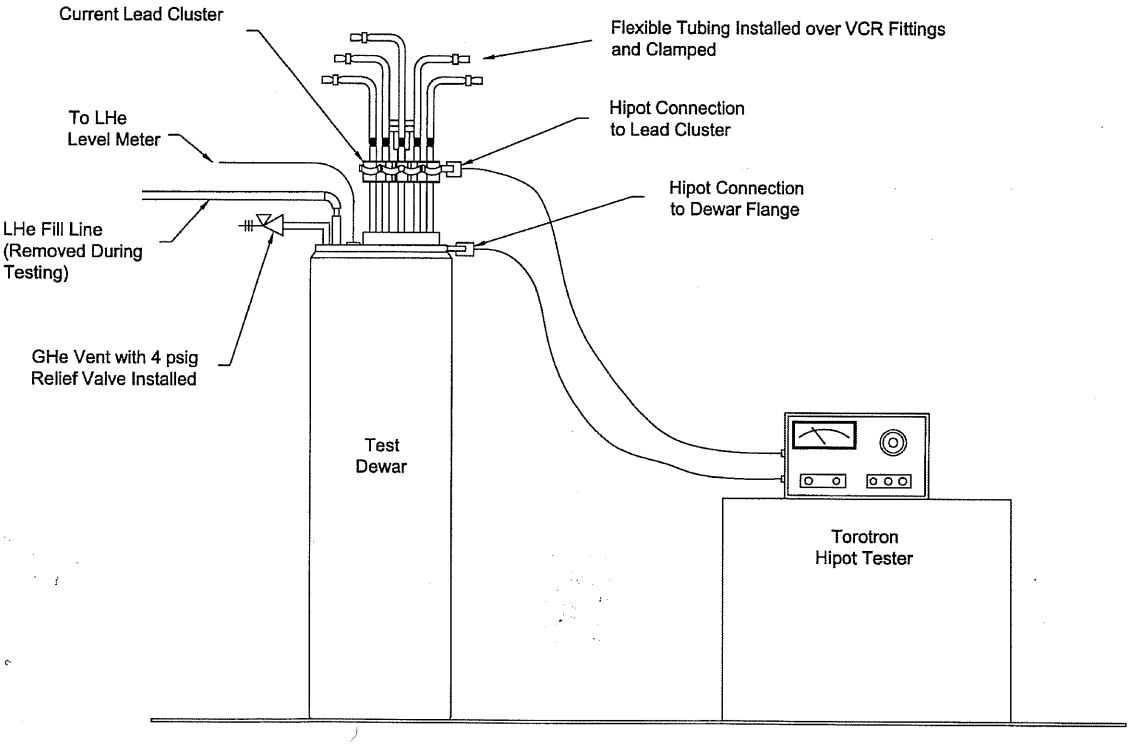
Figure 5
Hipot Test in Dewar
Test Setup



6. Full Current Testing, Stopped Up Leads Subtest and Heater Subtest

(Verification of current lead specification section 3.2)

This test will be performed to determine the functional operation of the current lead assembly at full rated current. The test will also comprise two subtests; stopped up leads and heater tests. These two subtests are intended to be performed on only the first set of lead clusters. Additional testing will be determined by the outcome of this initial test.

6.1 Connect current supply and test equipment to the test dewar as illustrated in Figure 6.
6.2 Fill the test dewar to TBD % with liquid helium (sufficient to cover the lower portions of the busbars).
6.3 Increase current output of current source until full current level is achieved.
  6.3.1 120 Amps in 120 Amp current lead assemblies.
  6.3.2 600 Amps in 600 Amp current lead assemblies.

6.4 Hold until voltage across current lead stabilizes. Test criterion is less than 80 mVolts across the current lead at full rated current.

NOTE: If Stopped Up Leads and Heater Subtests are not to be performed, skip to step 6.15.

6A. Stopped Up Leads Subtest

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6.5 With current leads at full rated current, close off vent tubes by clamping on rubber tubing.
6.6 Hold in this position for 60 seconds while monitoring the voltage across the lead.
6.7 Release the clamps and allow flow to be re-established.

6B. Heater Subtest

6.8 Inspect condition of current lead upper conductor.
6.9 If condensation (frost) is present, increase heater power.
6.10 Repeat inspection of current lead upper conductor and adjust heater power as necessary.
6.11 Re-establish nominal helium level (TBD%) as test progresses.
6.12 Continue test for a maximum of 30 minutes.
6.13 If results are satisfactory, subsequent current leads will not be tested for heater performance.
6.14 Record results on Current Lead Test Data Sheet.

6.15 Reduce current output of current source to zero.
6.16 Record Pass/Fail and pertinent description of results (voltage across current leads) on Current Lead Test Data Sheet.
6.17 Remove current test equipment.
6.18 Remove current lead assembly from test dewar.

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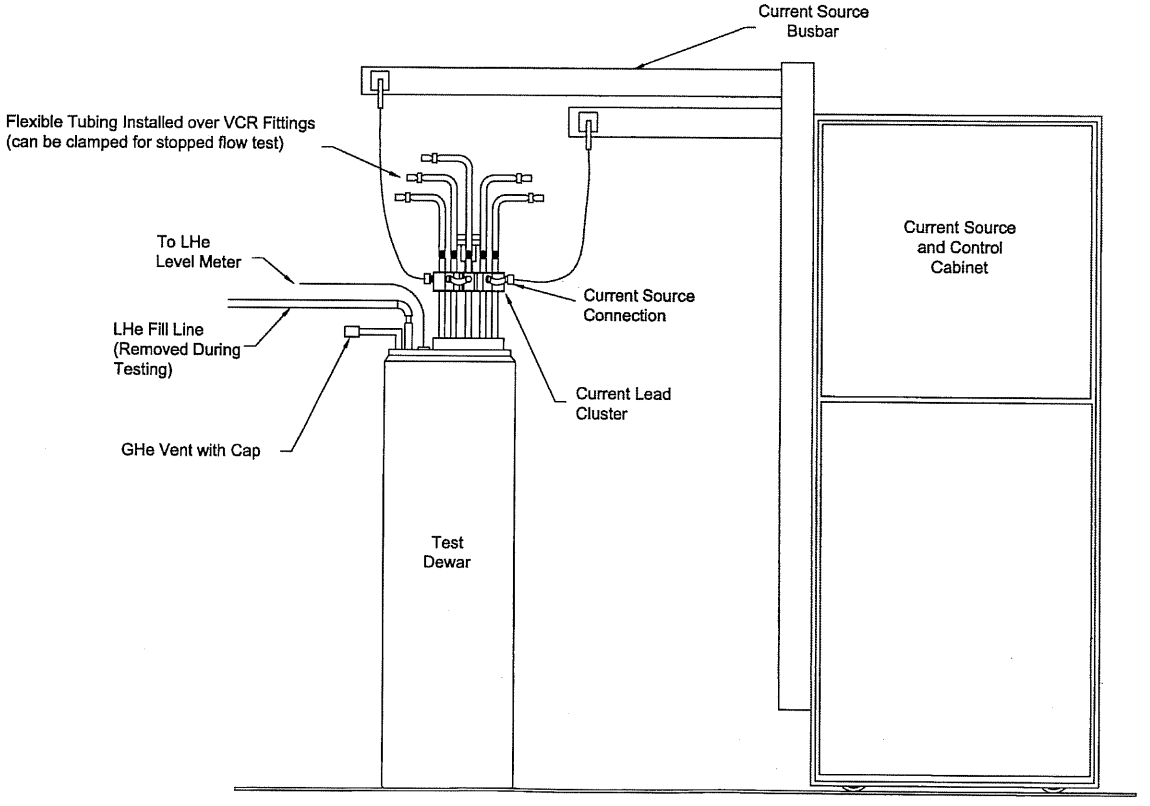
Figure 6
Full Current
Test Setup



Current Lead Data Sheet

The attached sheets illustrate an example Current Lead Test Data Sheet to be used for recording test results for each current lead assembly.

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APPENDIX B.

To: File
From: Jon Zbasnik
Re: Visit to American Magnetics, Nov. 4-5, 2003
Ref: LBNL PO 6703387
Date: Nov 6, 2003

Contacts at AMI:

Roger Efferson, General Manager
Greg Laughon, Engineer
Robert Fielden, Production Manager

Objectives of Visit:
Email dated Oct 31, 20003

Hi Greg,

I thought I'd jot down a few high-level objectives of my upcoming visit. We've discussed most of these. They are listed in rough order of priority.

1. Have a look at the lead manufacturing, and assess the status. Not necessary to witness anything proprietary.

2. Witness the power testing of a 600 A, 3-pair cluster. Hope you can get your cartridge heater installed to generate boiloff gas.

3. Witness the power testing of a 120 A, 5-pair cluster. I think I may have said this was not necessary, and I apologize, but I need to provide some advice to the CERN guys on how to control flow for these leads. They have a ton of 600 A HTS leads elsewhere in the machine, so they will use this hardware for your 600 A leads.

They need some guidance, though, on what to try for the 120 A leads.

4. Try out our soldering fixture(s) on your laminated cold terminals. I will bring along both 120 and 600 A solder fixtures, heater cartridge, thermometer, solder wire, and flux.

Detailed Report of Visit

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For Objective 1:

We toured the AMI production facility. Robert Fielden reported that :

All vapor cooled portions consisting of copper conductors in stainless tubes are made. All busbars are made and on hand. All other parts, such as G-10 tubes and plates, baffles, conflat flanges, cartridge heaters, thermometers, feedthroughs, VCR fittings, etc. are also on hand.

I was shown assembly fixtures and the chamber for pressure, leak, and air hipot measurements. There are two assembly fixtures machined from aluminum that allow AMI to radially orient the current lead assemblies per the engineering drawings. One is for the 120 A assembly and the other is for the 600 A assemblies. Another fixture is used to longitudinally position the G-10 tubes and baffles into the proper position. This fixture can be used for all assemblies by a clever arrangement.

The assembly process was put on hold until some details in the testing can be ironed out. AMI wanted to be sure the leads they were manufacturing were acceptable to LBNL before they got too far down the manufacturing path.

Greg and Robert agreed that if we can agree that the leads are acceptable and get the testing back on track during the visit, then AMI should be able to restart the assembly, and complete the project by the end of January, 2004.

To me, the manufacturing process appears to be under control and I have no particular concerns about it.

For Objective 2:

We note that one set of vapor cooled leads (2 each 6-lead 600 A assemblies, 1 each 2-lead, 600 A assemblies, and 1 each 10-lead 120A assembly) has been tested and shipped to Meyer Tool. A second set has been tested and the third set is in the process of being tested.

The concerns raised during testing were:

1. The voltage drop across the lead as packaged in the DFBX assembly is higher than what is measured for the "bare" leads. The voltage drop across a bare, 600 A lead is typically around 75 mV at full current, and for our assembly it is on the order of 90 mV. The higher voltage drop indicates that the temperature distribution along the lead in our cluster is different from the "bare" lead. This is probably caused by the G-10 tubes around each lead and their close packing. This does not appear to be a problem as AMI have now tested more than 12 of the 600 A leads and the behavior is consistent when all the data are reviewed.

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In order to prevent false trips in operation at CERN, AMI recommends that the threshold voltage for the 600 A leads in the DFBX be set to 130 mV and set to 100 mV for the 120 A leads.

2. Another concern was that the voltage drop across the 600 A leads continues to rise, albeit very slowly, as the current is held constant at 600 A. A current shunt reading shows that the current is held constant and the rise in voltage is not due to a rising current. We feel the slow increase in the voltage is caused by a drop in LHe level in the test setup.

The dewar inner diameter is about 9.5 inches, so there are 1.16 liter/inch. The expected boil-off rate for the 6-lead, 600 A cluster is about 6 liter/hour. The level therefore will drop about 5.2 inch/hour. The test must be stopped when the liquid level reaches the bottom of the Bus bar. This allows us to use about 7.8 inch, so the test duration is on the order of 1.5 hours. As the level drops, the heat input to the bath drops, which causes the flow rate to drop.

Also, as the level drops, the gas stratification changes which causes the inlet gas temperature to rise. AMI has confirmed this by measuring the inlet gas temperature as a function of liquid level. The increase in temperature appeared to be more for the DFBX leads than the bare leads.

AMI is using rotameter-type flowmeters that are sufficiently accurate to provide an indication of flowrate, but do not have enough precision or resolution to get an accurate measure of the absolute value of the flow rate.

The dependence of voltage drop on flow rate in these leads is generally well-known, and AMI performed two different measurements to demonstrate this. In the first measurement, the 6-lead cluster was wired so only 2 leads were powered and the other 4 leads had no current. The unpowered leads were used as heaters to generate boiloff gas to augment the flow through the powered pair. In this measurement, by manually controlling the flow rates, the voltage drop across the powered lead could be kept rather steady.

In the second measurement, an electric heater in the bath was used to generate extra boiloff for the 6-lead, 600 A cluster. In this measurement, it was shown that a slight increase in boiloff from the heater was able to compensate for the drop in helium level and cause the voltage drop to decrease.

We are therefore confident that there is no problem with lead stability. In the DFBX, there will not be the limited helium volume as in the AMI small test dewar and there will be sufficient boiloff from other sources such as lead chimneys and cryogenic piping.

Another complication in the test is that with leads hydraulically connected in parallel, one lead will have a higher voltage drop than the others, due to a slight imbalance in the flow rate. Theoretically, this could be corrected by putting a back pressure on the system so that the pressure drop difference across the different leads was small compared to the system pressure. This would result in a more even flow distribution in the

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cluster. We tried several schemes to do this, using equipment and hardware readily available at AMI, to no avail. We considered and rejected ideas to modify the test setup that would automatically ensure an even flow balance.

It appears that the approach used by AMI should be continued as being the most straightforward way to complete the testing. This approach is to cool down the leads, fill with LHe, ramp to full current, and manually adjust the lead flows to maintain relatively equal lead voltage drops across the leads. Do this until the helium level drops to the bottom of the bus bar. Include in the test report plots of the voltage traces and liquid level. The test duration is a little over an hour.

The voltage plots will demonstrate that the leads are properly constructed. A bad lead would show a voltage far above the others and would have a noticeably higher flow rate than the others. Thus far, AMI has observed no big discrepancy in flow rates in the DFBX leads they have tested.

The liquid level plots can be analysed to yield a liter/hour loss rate; this will show that the lead assembly has the expected heat load.

For Objective 3:

There was not enough time to perform any tests on 120 A leads. AMI recommends that CERN follow the same philosophy in monitoring and controlling flow rates for the 120 A leads as they would for the 600 A leads: Monitor the lead voltage drop and adjust the flow rate to maintain a constant voltage drop around 75 mV. If a lead voltage drop rises, then open the flow valve slightly to allow more flow through the lead, which will cause the voltage to drop back into line. Conversely, if the voltage drop falls, then the flow rate can be closed down slightly to drop the flow rate and allow the voltage to rise.

Objective 4:

Solder Connections to AMI Leads

There was no time to make any splice joints at AMI, but the splice procedures were discussed with Robert Fielden and the solder boxes checked for fitup.

The new 600 A solder box fit the AMI busses properly. The 120 A solder box was a little tight and the width should be opened up by about .010 inch.

Robert confirmed that the AMI bus bars are tinned with Stay Bright solder. The bars are laminates of Nb3Sn conductor, sandwiched between copper bars. 60-40 solder is used to make the laminate.

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We should consider changing the splicing solder from Stay Bright to 60/40 to reduce the tendency of the AMI bus bars to delaminate. Robert said that AMI routinely uses 60/40 solder in making connections to the Stay Bright coated busses and we could easily do the same.

We plan to install a conductor stiffener clamp above the splice joint region, and this will help to prevent delamination of the AMI busses. The clamp is made of G-10, and going to a 60/40 solder with its lower melting point will help to prevent damage to the clamp.

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APPENDIX C. Test Reports from American Magnetics

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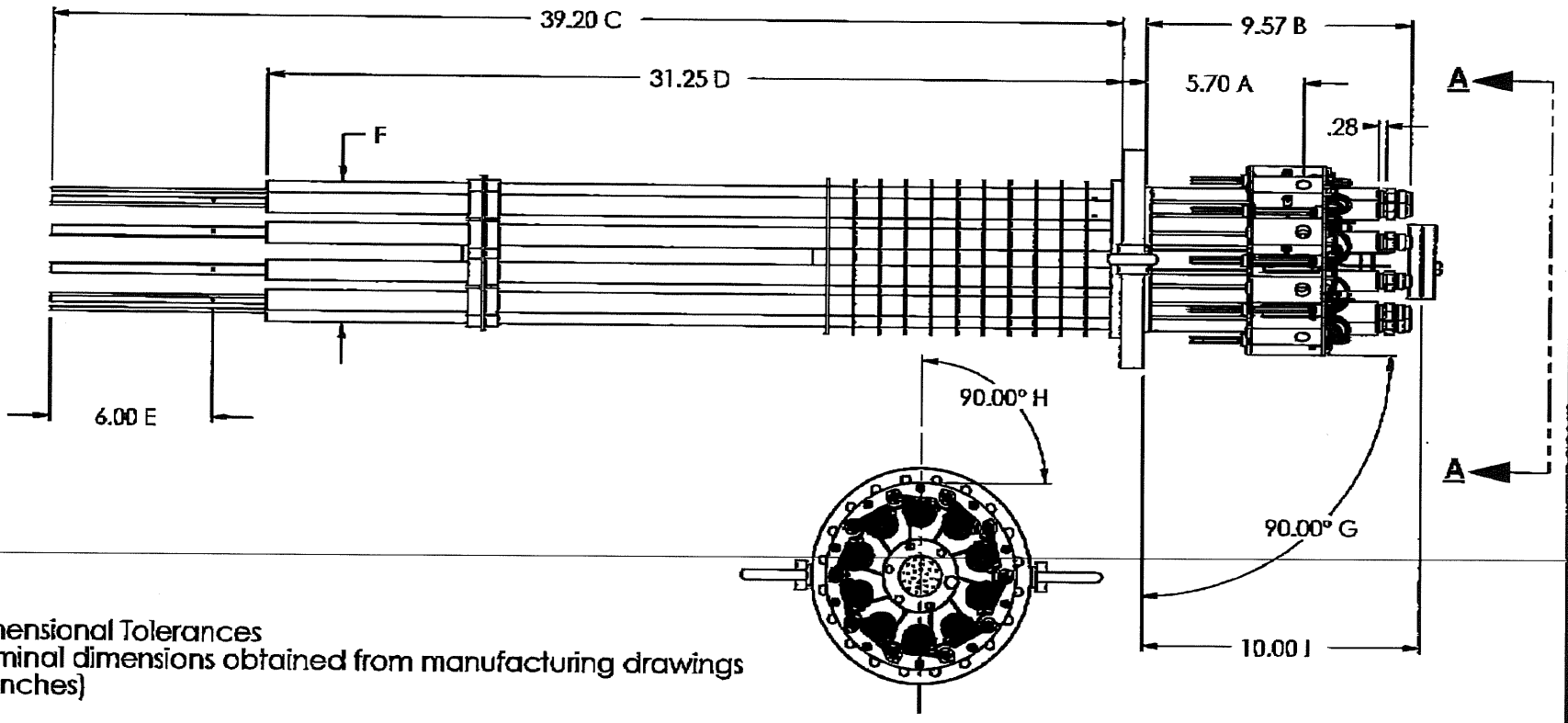

Dimensional Tolerances
Nominal dimensions obtained from manufacturing drawings
(in inches)

A (Top of flange to power cable connection) - Nominal +/- .10"
B (Top of flange to cooling gas outlets) - Nominal +/- .10"
C (Bottom of flange to end of busbar) - Nominal +/- .10"
D (Bottom of flange to end of G-10 insulating tube - Nominal +/- .10"
E (Bottom of busbar to voltage tap hole) - Nominal +/- .10"
F (Lead envelope outer diameter) - < 5.15 for 120 Amp lead < 5.10 for 600 Amp lead
G (Datum to conductor face orientation) - Perpendicular +/- .03"
H (Datum to conductor face orientation) - Perpendicular +/- .03"
I (Top of flange to split line of feedthrough (not required by LBNL) - +.10"/- .20"

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TOLERANCES UNLESS OTHERWISE SPECIFIED	**AMERICAN MAGNETICS INC.**			
FRACTIONS ± 1/64 .XX DECIMALS ± 0.01 .XXX DECIMALS ± 0.005 ANGLES ± 0°-30' BREAK SHARP EDGES 1/64 MAX SURFACE FINISH = 63 RMS	DESCRIPTION LBNL 120 AMP VCCL DIMENSIONAL REQ'S			
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES	DATE: 6/18/03	DRAWN BY: GJL	REVIEWED BY:	APPROVED BY:
	SCALE 1:6	SIZE A	DRAWING NO. 03-9551-3006	SHEET 1 OF 1	REV 1

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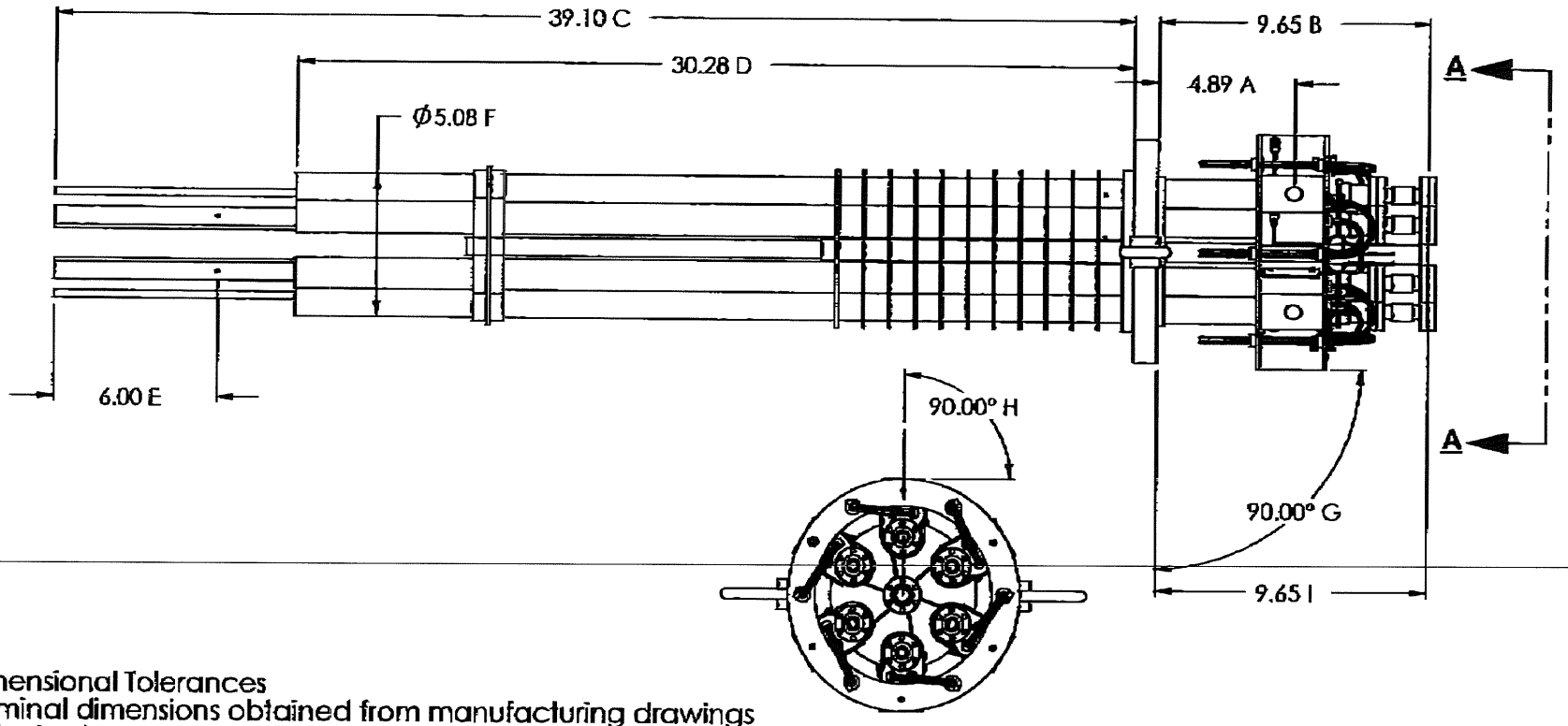

VIEW A-A

Dimensional Tolerances
Nominal dimensions obtained from manufacturing drawings
(in inches)

A (Top of flange to power cable connection) - Nominal +/- .10"
B (Top of flange to cooling gas outlets) - Nominal +/- .10"
C (Bottom of flange to end of busbar) - Nominal +/- .10"
D (Bottom of flange to end of G-10 insulating tube - Nominal +/- .10"
E (Bottom of busbar to voltage tap hole) - Nominal +/- .10"
F (Lead envelope outer diameter) - < 5.15 for 120 Amp lead < 5.10 for 600 Amp lead
G (Datum to conductor face orientation) - Perpendicular +/- .03"
H (Datum to conductor face orientation) - Perpendicular +/- .03"
I (Top of flange to split line of feedthrough (not required by LBNL) - +.10"/- .20"

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TOLERANCES UNLESS OTHERWISE SPECIFIED	AMERICAN MAGNETICS INC.			
FRACTIONS ± 1/64 XX DECIMALS ± 0.01 XXX DECIMALS ± 0.005 ANGLES ± 0°-30' BREAK SHARP EDGES 1/64 MAX SURFACE FINISH = 63 RMS	DESCRIPTION LBNL 600 AMP VCCL DIMENSIONAL REQ'S			
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES	DATE: 6/18/03	DRAWN BY: GJL	REVIEWED BY:	APPROVED BY:
	SCALE 1:6	SIZE A	DRAWING NO. 03-9551-3005	SHEET 1 OF 1 REV 0

P.O. Box 2509
112 Flint Road
Oak Ridge, TN 37831-2509
Phone: (865) 482-1056 x46
Fax: (865) 482-5472
http://www.americanmagnetics.com

American Magnetics, Inc.

Fax

To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5310	**Pages:**	17
Phone:		**Date:**	8/27/03
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

● **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

3W0731A	120 Amp 5-lead pair cluster
3W0731B	600 Amp 3-lead pair cluster
3W0731C	600 Amp 3-lead pair cluster
3W0731D	600 Amp 1-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0731 A

Dwg and Rev Number 03-7557-3006 R1
03-7557-2938 R2

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #1	5 45/64		8-7-03 Jack
Lead #2	5 23/32		
Lead #3	5 47/64		
Lead #4	5 47/64	5.73	
Lead #5	5 23/32		
Lead #6	5 33/32		
Lead #7	5 43/64		
Lead #8	5 11/16	5.69	
Lead #9	5 45/64		
Lead #10	5 45/64		

Dimension B

Lead #1	9 37/64		8-7-03 Jack
Lead #2	9 37/64		
Lead #3	9 37/64		
Lead #4	9 37/64		
Lead #5	9 19/32	9.59	
Lead #6	9 37/64		
Lead #7	9 35/64	9.55	
Lead #8	9 9/16		
Lead #9	9 37/64		
Lead #10	9 19/32		

Dimension C

Lead #1	39 3/16		8-7-03 Jack
Lead #2	39 3/16		
Lead #3	39 3/16		
Lead #4	39 3/16		
Lead #5	39 13/64		
Lead #6	39 13/64		
Lead #7	39 1/4	39.25	
Lead #8	39 7/32		
Lead #9	39 13/64		
Lead #10	39 3/16	39.19	

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Test #	Test Title		Date	Technician

Dimension D

Lead #1	31 17/64		8-7-03	Jack
Lead #2	31 9/32			
Lead #3	31 1/4	31.25		
Lead #4	31 17/64			
Lead #5	31 17/64			
Lead #6	31 17/64			
Lead #7	31 5/16	31.31		
Lead #8	31 5/16			
Lead #9	31 5/16			
Lead #10	31 17/64			

Dimension E

Lead #1	6		8-7-03	Jack
Lead #2	6			
Lead #3	6			
Lead #4	6			
Lead #5	6			
Lead #6	6			
Lead #7	6			
Lead #8	6			
Lead #9	6			
Lead #10	6			

Dimension F	5 9/64	5.141	8-7-03	Jack

Dimension G

Lead #1	1/64		8-7-03	Jack
Lead #2	1/64			
Lead #3	1/64			
Lead #4	1/64			
Lead #5	0			
Lead #6	0			
Lead #7	1/64			
Lead #8	0			
Lead #9	1/64			
Lead #10	0			

Dimension H	.002		8-7-03	Jack

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	8-5-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	8-6-03	RF
	Leak rate achieved?	1×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	8-6-2003	D.F.L.
	Isolation voltage achieved	2Kv / 4Kv		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	8/18/03	GJL
	Isolation voltage achieved	600 V		
6	**Full Current Test** < 100 mV			
	Result (circle one)	Pass/Fail	8/18/03	GJL
	Max voltage across lead			
	Lead 1	73 mV		
	Lead 2	72 mV		
	Lead 3	73 mV		
	Lead 4	74 mV		
	Lead 5	71 mV		
	Lead 6	71 mV		
	Lead 7	71 mV		
	Lead 8	71 mV		
	Lead 9	70 mV		
	Lead 10	76 mV		

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Test #	Test Title		Date	Technician

6A Optional Stopped Flow Test

Result (circle one) Pass/Fail/NR 8/18/03 GJL

Final voltage across lead

Lead 1 74 mV
Lead 2 71 mV
Lead 3 74 mV
Lead 4 73 mV
Lead 5 73 mV
Lead 6 74 mV
Lead 7 74 mV
Lead 8 73 mV
Lead 9 72 mV
Lead 10 78 mV

6B Optional Lead Heater Test

Heater voltage input 24 VAC 8/12/03 GJL

Condition of lead conductor

Lead 2 TEMP = 28°F

Lead 2 TEMP = 110°F AFTER 15 MINUTES

Project Engineer

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0731B

Dwg and Rev Number [redacted] 03-9551-3005 R0
03-7481-2939 R2

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A

Lead #1	4 57/64	4.89	8-7-03 Jack
Lead #2	4 57/64		
Lead #3	4 57/64		
Lead #4	4 7/8	4.88	
Lead #5	4 7/8		
Lead #6	4 57/64		
Lead			
Lead			
Lead			
Lead			

Dimension B

Lead #1	9 43/64	9.67	8-7-03 Jack
Lead #2	9 21/32		
Lead #3	9 21/32		
Lead #4	9 41/64	9.64	
Lead #5	9 21/32		
Lead #6	9 21/32		
Lead			
Lead			
Lead			
Lead			

Dimension C

Lead #1	39 11/64	39.17	8-7-03 Jack
Lead #2	39 11/64		
Lead #3	39 11/64		
Lead #4	39 11/64		
Lead #5	39 9/64		
Lead #6	39 3/16	39.188	
Lead			
Lead			
Lead			
Lead			

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Test #	Test Title		Date	Technician
	Dimension D			
Lead #1	30 19/64	30.30	8-7-03	Jack
Lead #2	30 5/16			
Lead #3	30 21/64			
Lead #4	30 21/64			
Lead #5	30 21/64	30.33		
Lead #6	30 21/64			
Lead				
Lead				
Lead				
Lead				
	Dimension E			
Lead #1	6		8-7-03	Jack
Lead #2	6			
Lead #3	6			
Lead #4	5 61/64	5.95		
Lead #5	6			
Lead #6	6			
Lead				
Lead				
Lead				
Lead				
Dimension F	5 5/64	5.08	8-7-03	Jack
	Dimension G			
Lead #1	1/64		8-7-03	Jack
Lead #2	1/64			
Lead #3	1/64			
Lead #4	1/64			
Lead #5	1/64			
Lead #6	0			
Lead				
Lead				
Lead				
Lead				
Dimension H	.011		8-7-03	Jack

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	7-31-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	8-1-03	RF
	Leak rate achieved?	3.8×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	8-6-03	SB
	Isolation voltage achieved	2Kv / 4Kv		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	8-14-03	GB
	Isolation voltage achieved	600 V		
6	**Full Current Test**	< 100 mV		
	Result (circle one)	Pass/Fail	8/15/03	GJ

Max voltage across lead

Lead 1 78 mV
Lead 2 77 mV
Lead 3 80 mV
Lead 4 80 mV
Lead 5 82 mV
Lead 6 81 mV
Lead
Lead
Lead
Lead

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Test #	Test Title		Date	Technician

6A Optional Stopped Flow Test

Result (circle one) Pass/Fail/NR 8/15/03 GJ2

Final voltage across lead

Lead 1 75 mV
Lead 2 75 mV
Lead 3 84 mV
Lead 4 86 mV
Lead 5 82 mV
Lead 6 84 mV
Lead 7
Lead
Lead
Lead

6B Optional Lead Heater Test

Heater voltage input 24 VAC 8/15/03 GJ2

Condition of lead conductor

Lead 2 TEMP 5°F

Lead 2 TEMP 100°F IN 20 MINUTES

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0731C

Dwg and Rev Number 03-9551-3005-120 03-7481-2939-122

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #7	4 57/64	4.89	8-7-03	Jack
Lead #8	4 57/64			
Lead #9	4 29/32	4.91		
Lead #10	4 57/64			
Lead #11	4 57/64			
Lead #12	4 57/64			
Lead				
Lead				
Lead				
Lead				

Dimension B

Lead #7	9 21/32	9.66	8-7-03	Jack
Lead #8	9 21/32			
Lead #9	9 43/64			
Lead #10	9 21/32			
Lead #11	9 43/64	9.67		
Lead #12	9 21/32			
Lead				
Lead				
Lead				
Lead				

Dimension C

Lead #7	39 5/32	39.16	8-7-03	Jack
Lead #8	39 9/64			
Lead #9	39 3/16			
Lead #10	39 1/8	39.13		
Lead #11	39 9/64			
Lead #12	39 9/64			
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician

Dimension D

Lead #7	30 5/16 30.31	8-7-03	Jack
Lead #8	30 5/16		
Lead #9	30 5/16		
Lead #10	30 5/16		
Lead #11	30 5/16		
Lead #12	30 19/64 30.30		
Lead			
Lead			
Lead			
Lead			

Dimension E

Lead #7	6	8-7-03	Jack
Lead #8	6		
Lead #9	6		
Lead #10	6		
Lead #11	6		
Lead #12	6		
Lead			
Lead			
Lead			
Lead			

Dimension F	5 5/64	8-7-03	Jack

Dimension G

Lead #7	0	8-7-03	Jack
Lead #8	1/64		
Lead #9	0		
Lead #10	0		
Lead #11	0		
Lead #12	0		
Lead			
Lead			
Lead			
Lead			

Dimension H	.003	8-7-03	Jack

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	8-1-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	8-4-03	RF
	Leak rate achieved?	2.2×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	8-6-03	JB
	Isolation voltage achieved	2Kv / 4Kv		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	8/22/03	GJL
	Isolation voltage achieved	600 V		
6	**Full Current Test** < 100mV			
	Result (circle one)	Pass/Fail	8/22/03	GJL
	Max voltage across lead			
	Lead 7	85 mV		
	Lead 8	90 mV		
	Lead 9	90 mV		
	Lead 10	84 mV		
	Lead 11	91 mV		
	Lead 12	86 mV		
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer [signature]

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Test #	Test Title		Date	Technician

6A Optional Stopped Flow Test

Result (circle one) Pass/Fail/NR 8/22/03 GJL

Final voltage across lead

Lead 7 85 mV
Lead 8 92 mV
Lead 9 92 mV
Lead 10 87 mV
Lead 11 90 mV
Lead 12 85 mV
Lead
Lead
Lead
Lead

6B Optional Lead Heater Test

Heater voltage input 24 VAC 8/22/03 GJL

Condition of lead conductor 8/22/03 GJL

Lead 10 TEMP = -14°F

Lead 10 TEMP = 110°F IN 23 MINUTES

Project Engineer

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0731 D

Dwg and Rev Number 03-9551-3005 R0
03-7481-2940 R2

Test #	Test Title		Date	Technician
1	Dimensional Check			
	Dimension A			
	Lead #13	4 57/64 4.89	8-7-03	Jack
	Lead #14	4 29/32 4.91		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension B			
	Lead #13	9 21/32 9.66	8-7-03	Jack
	Lead #14	9 21/32		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension C			
	Lead #13	39 9/64 39.14	8-7-03	Jack
	Lead #14	39 9/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #13 30 9/32	30.28	8-7-03	Jack
	Lead #14 30 9/32			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #13 6		8-7-03	Jack
	Lead #14 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F		8-7-03	Jack
	Dimension G			
	Lead #13 1/64		8-7-03	Jack
	Lead #14 0			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H 002		8-7-03	Jack

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	8-4-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	8-5-03	RF
	Leak rate achieved?	2.6×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail		
	Isolation voltage achieved			
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	8-12-03	GB.
	Isolation voltage achieved	600 V		
6	**Full Current Test** < 100 mV		8/26/03	GJL
	Result (circle one)	Pass/Fail	~~8-12-03~~	~~GB.~~
	Max voltage across lead			
	Lead 13	74 mV		
	Lead 14	68 mV		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer

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Test #	Test Title		Date	Technician

6A Optional Stopped Flow Test

Result (circle one) Pass/Fail/NR 8/26/03 GJL

Final voltage across lead

Lead 13 75 mV

Lead 14 68 mV

Lead

Lead

Lead

Lead

Lead

Lead

Lead

Lead

6B Optional Lead Heater Test

Heater voltage input 24 VAC 8/26/03 GJL

Condition of lead conductor

Lead 13 TEMP = -15°F

Lead 13 TEMP = 115°F IN 26 MINUTES

Project Engineer

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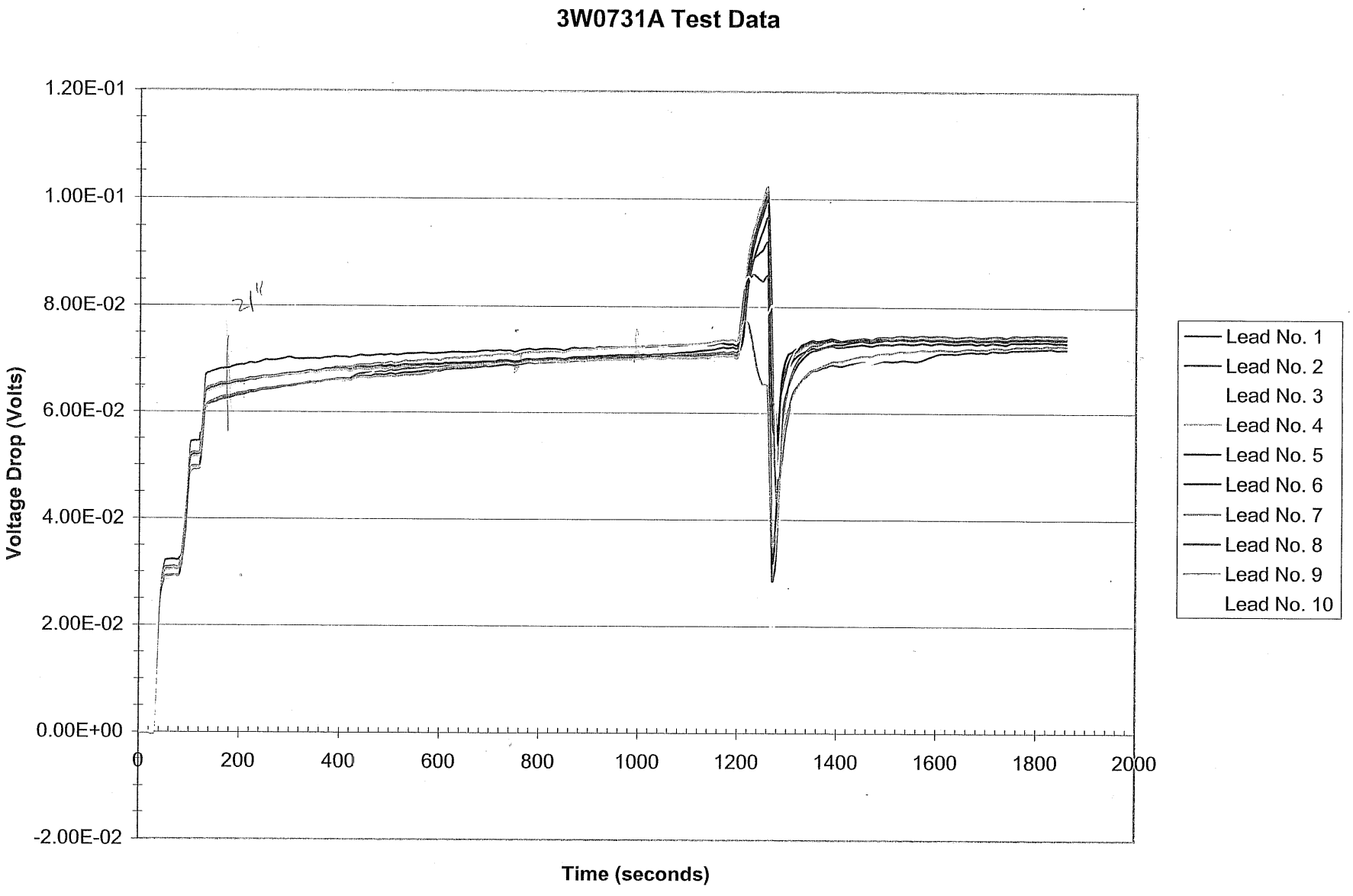

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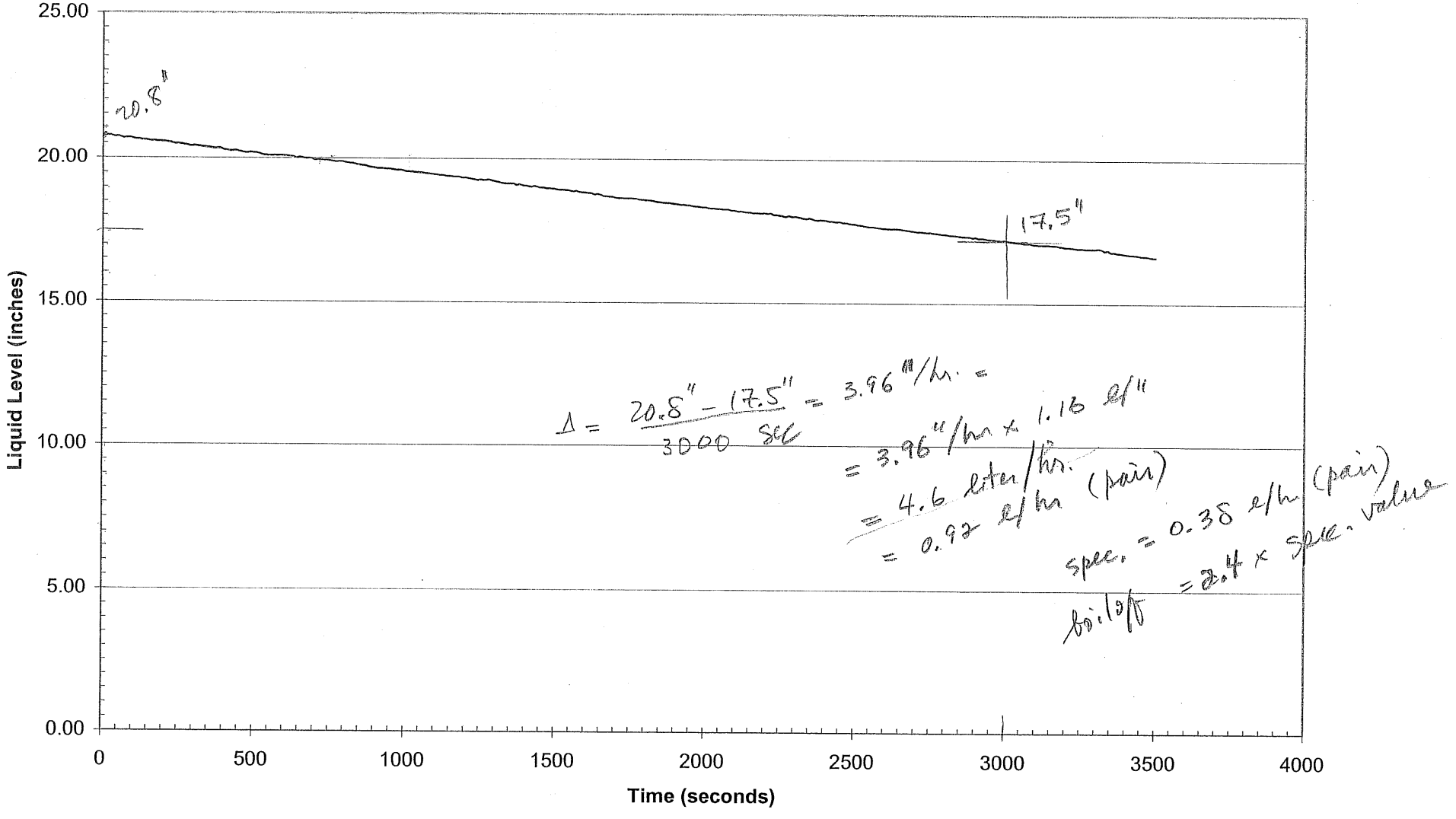
3W0731A Helium Consumption



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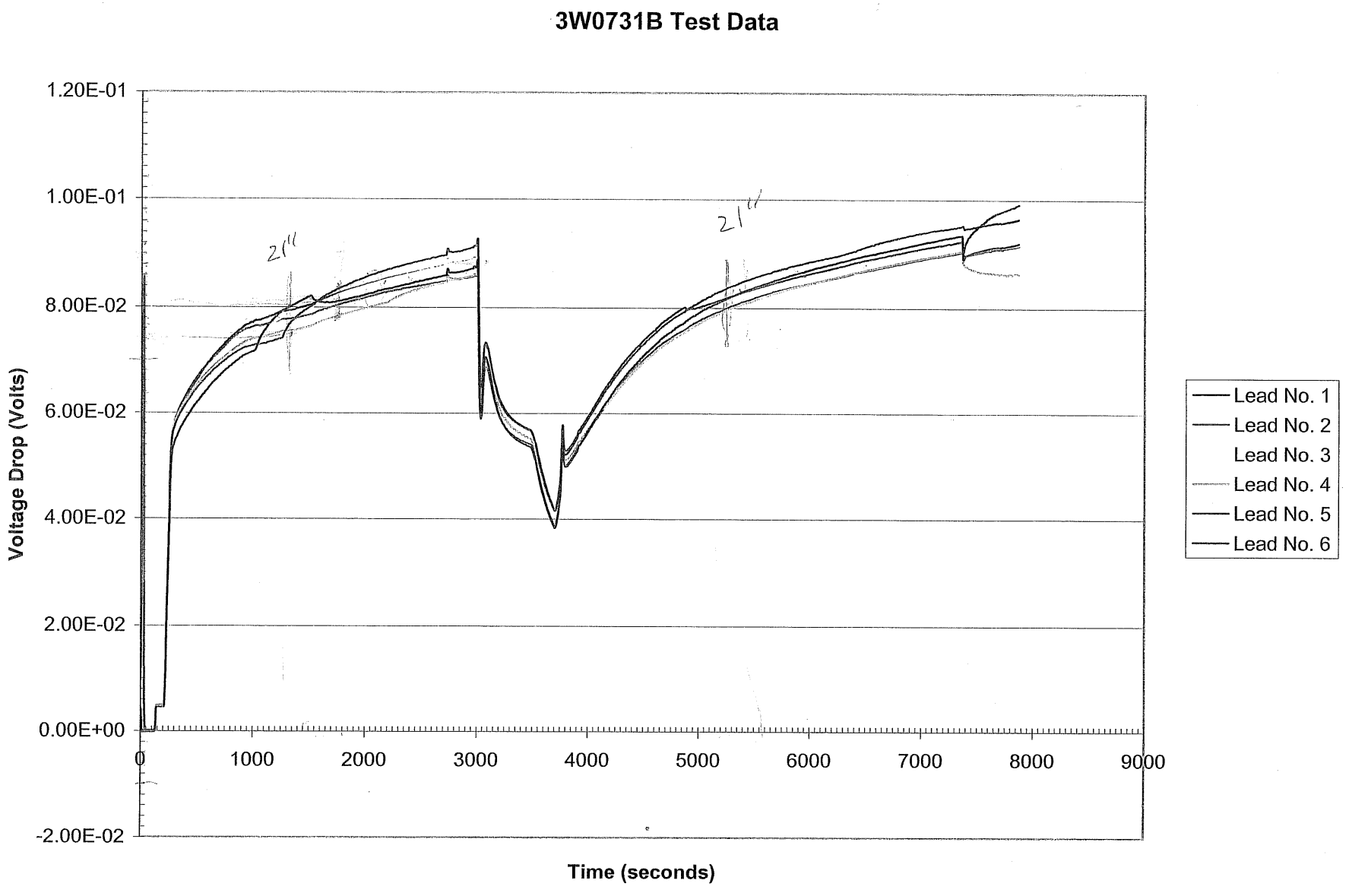

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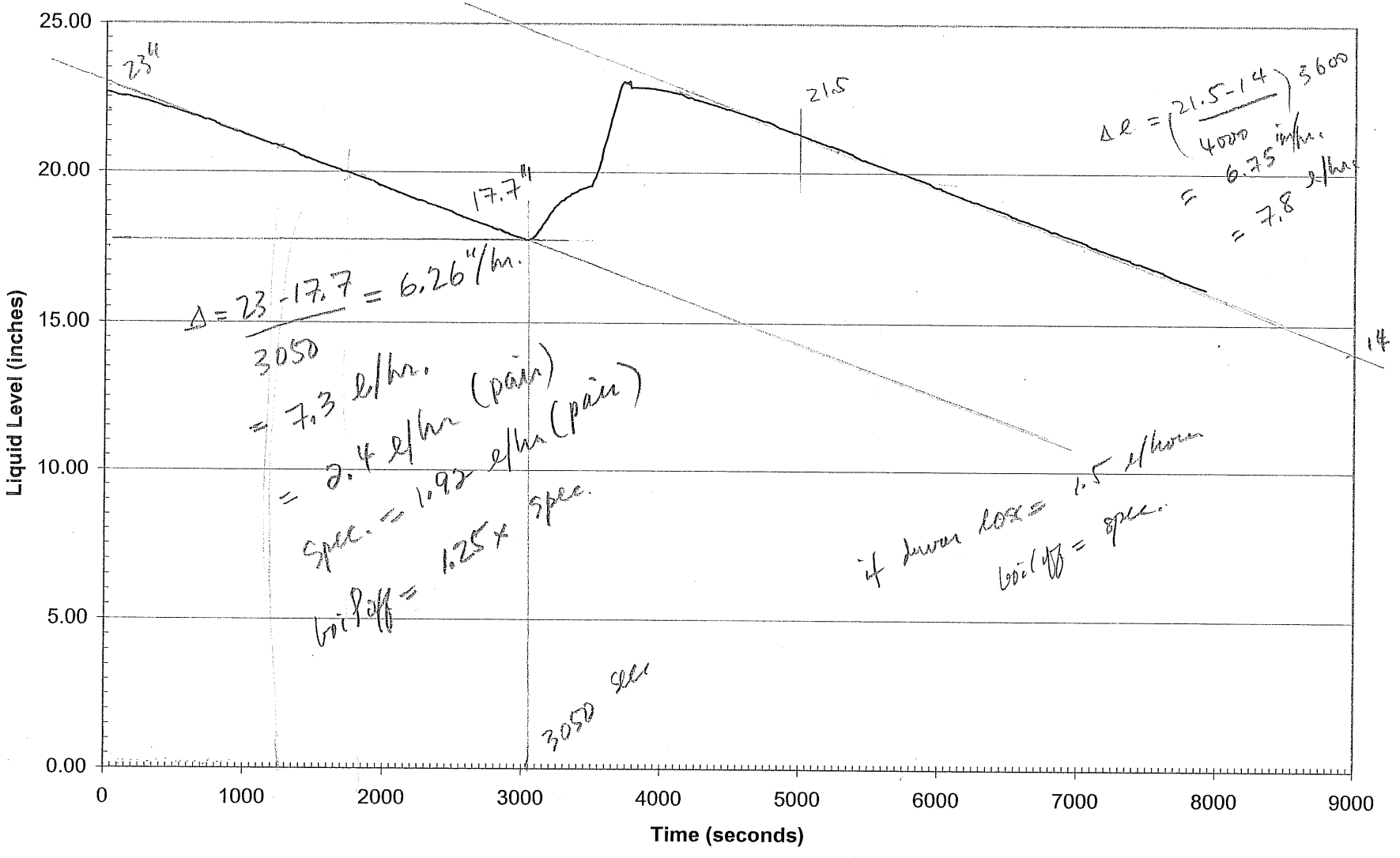
3W0731B Helium Consumption



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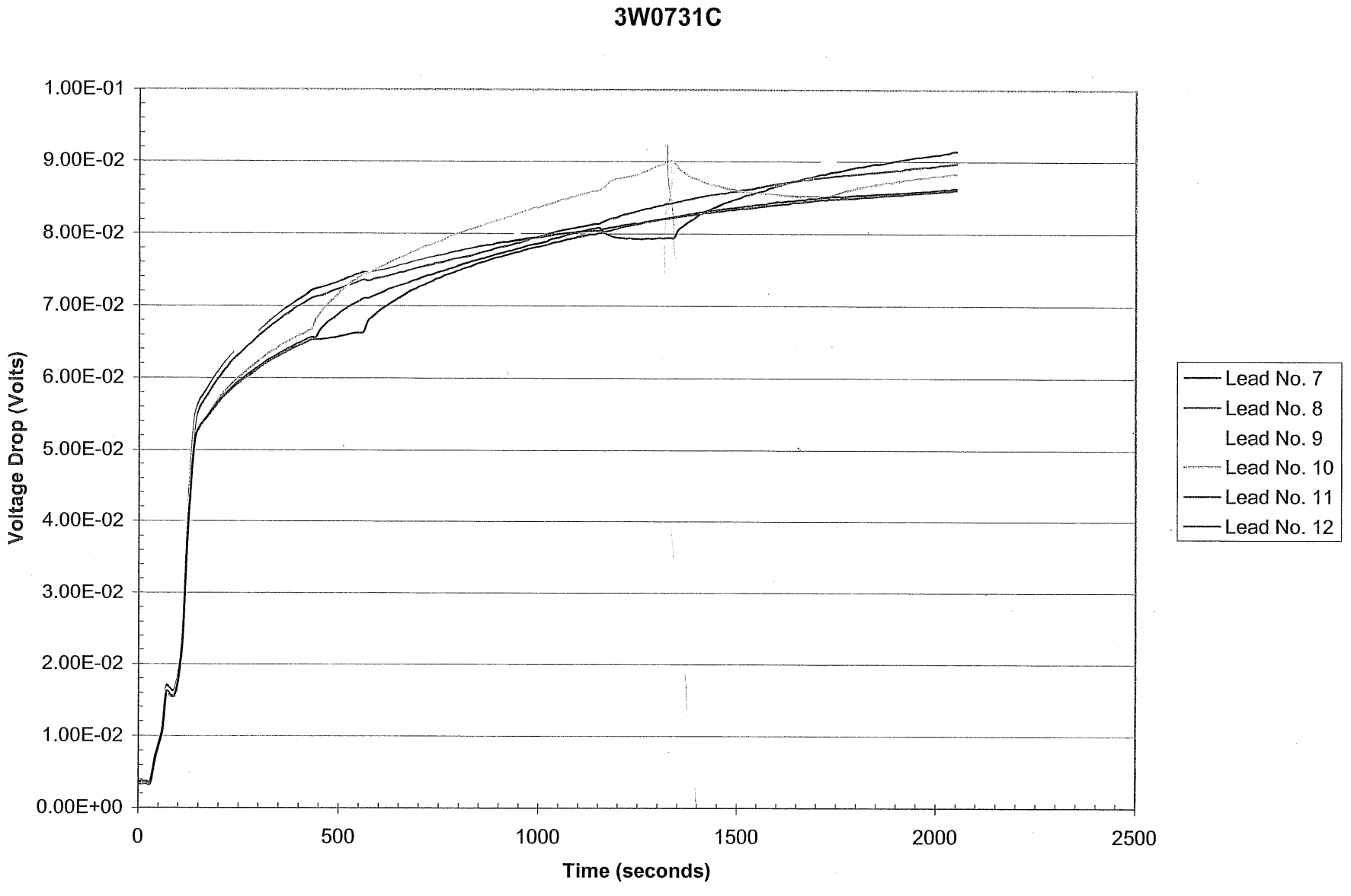

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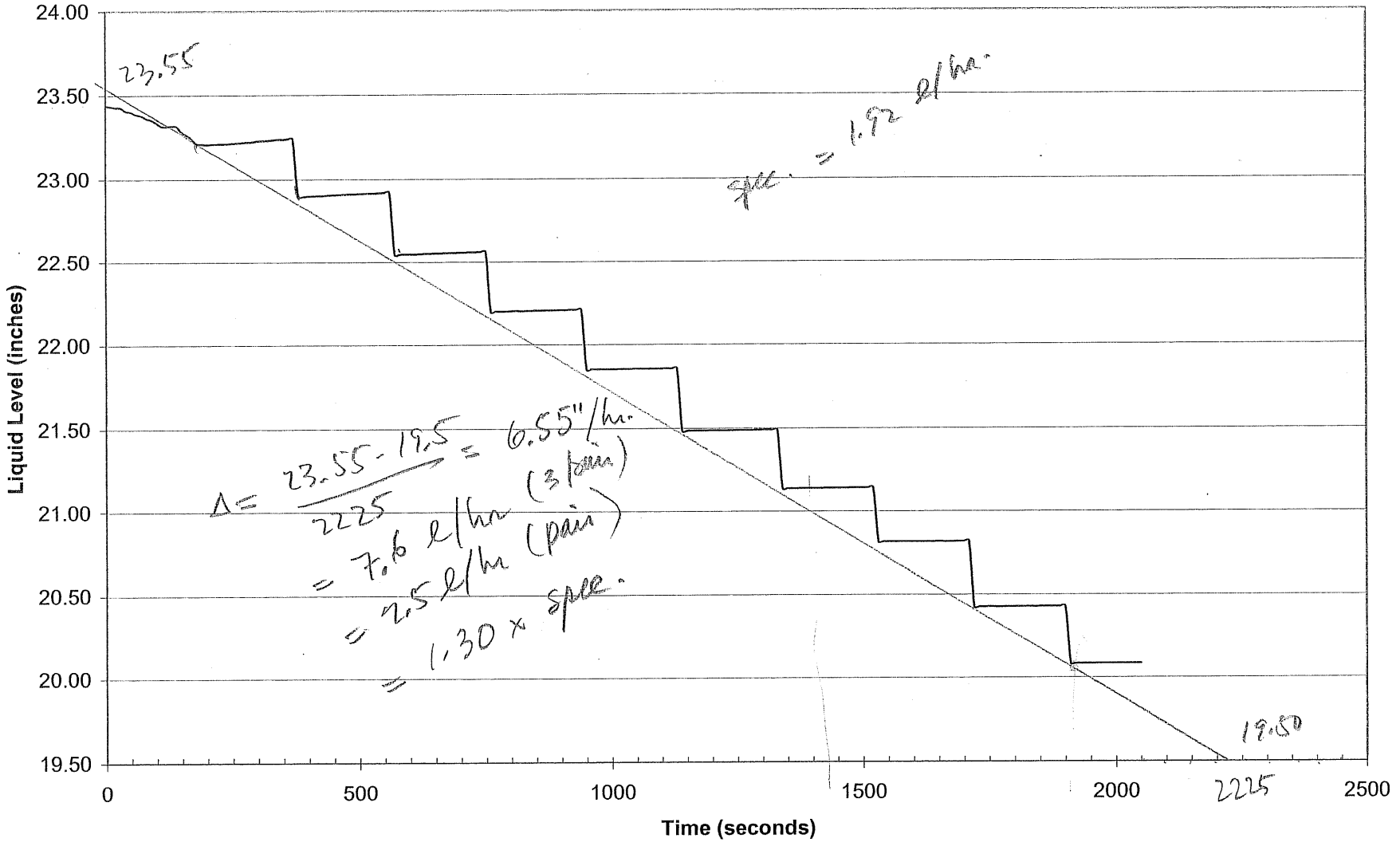
3W0731C Helium Consumption



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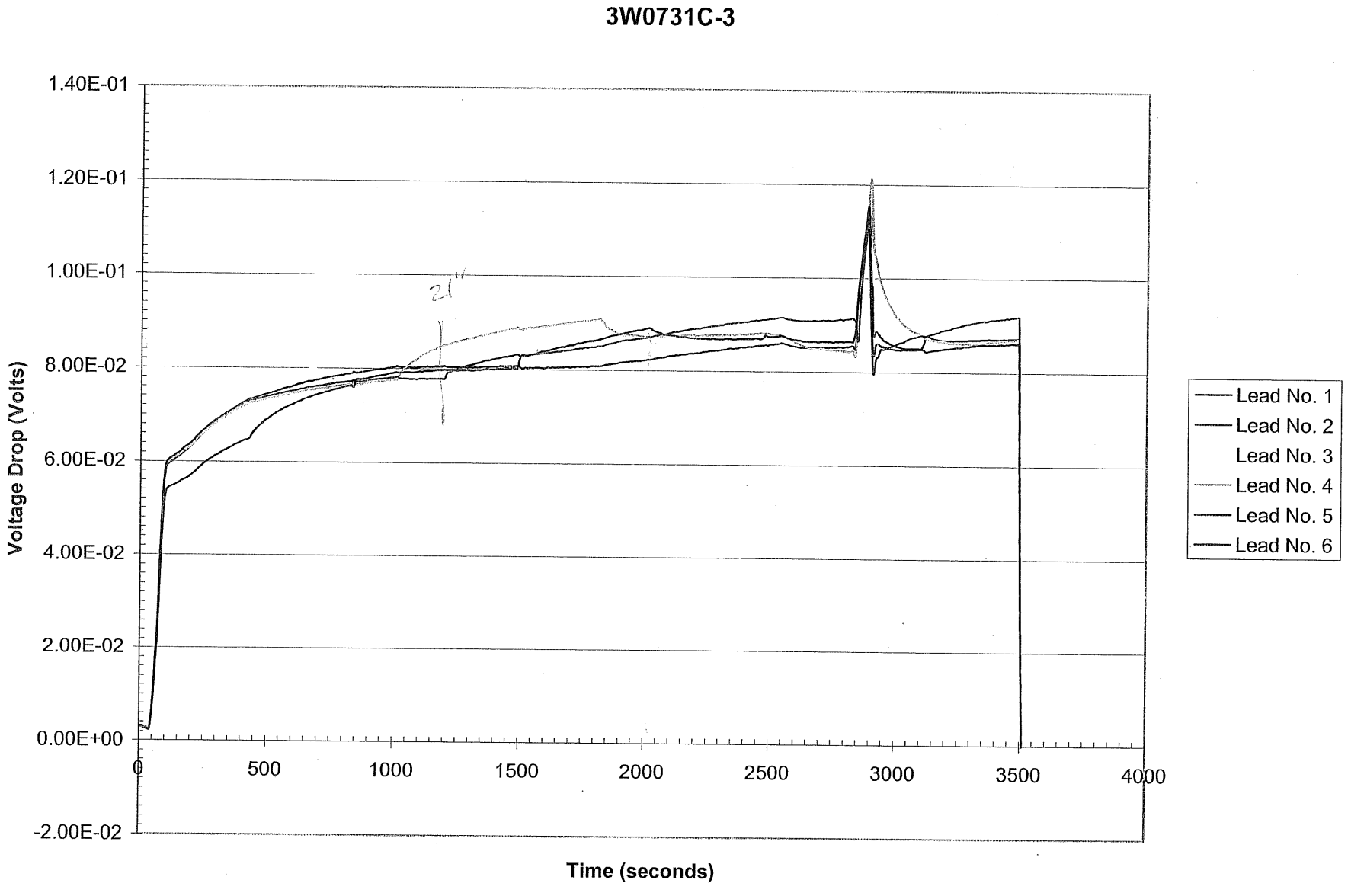

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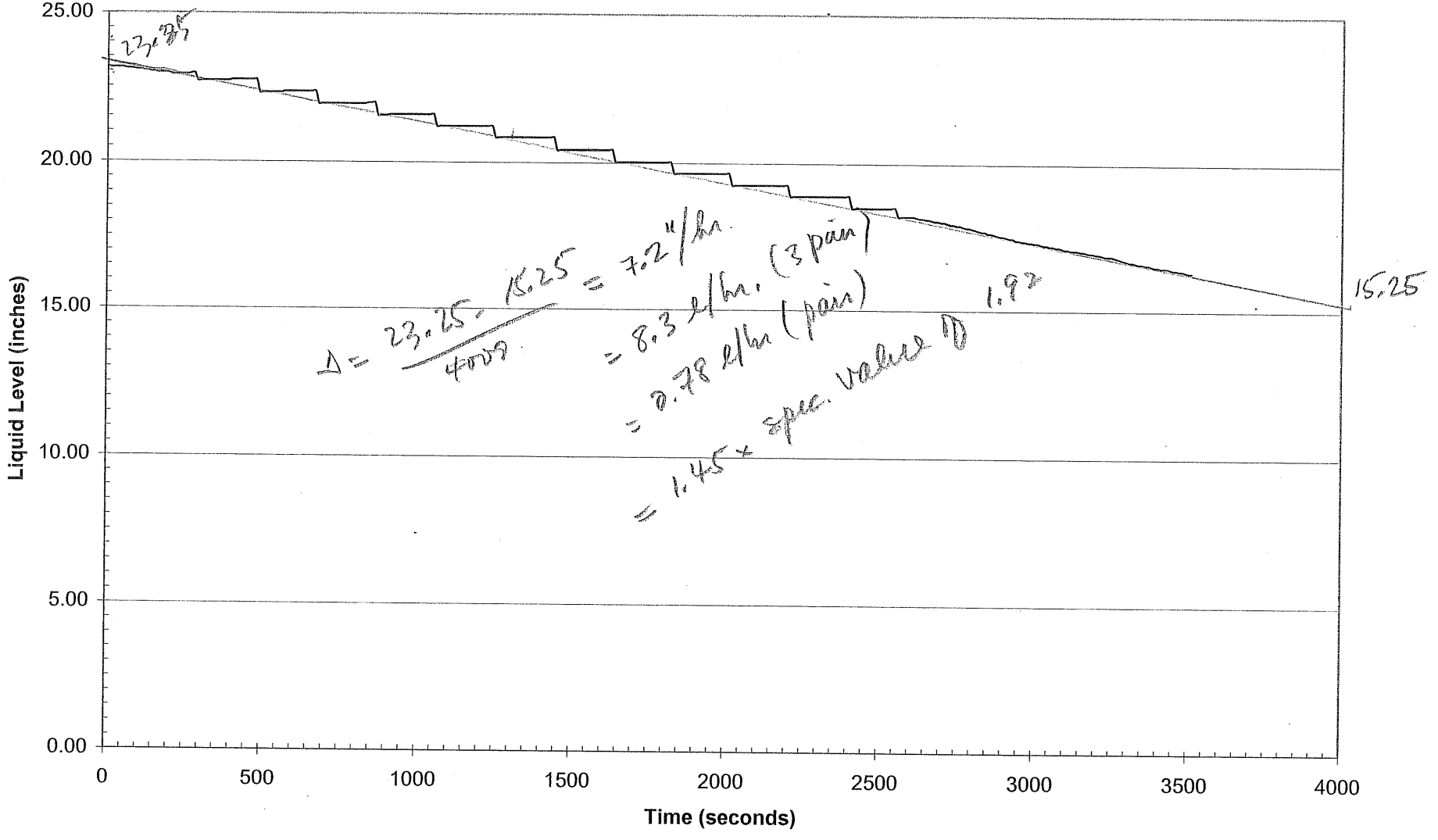
3W0731C-3 Helium Consumption



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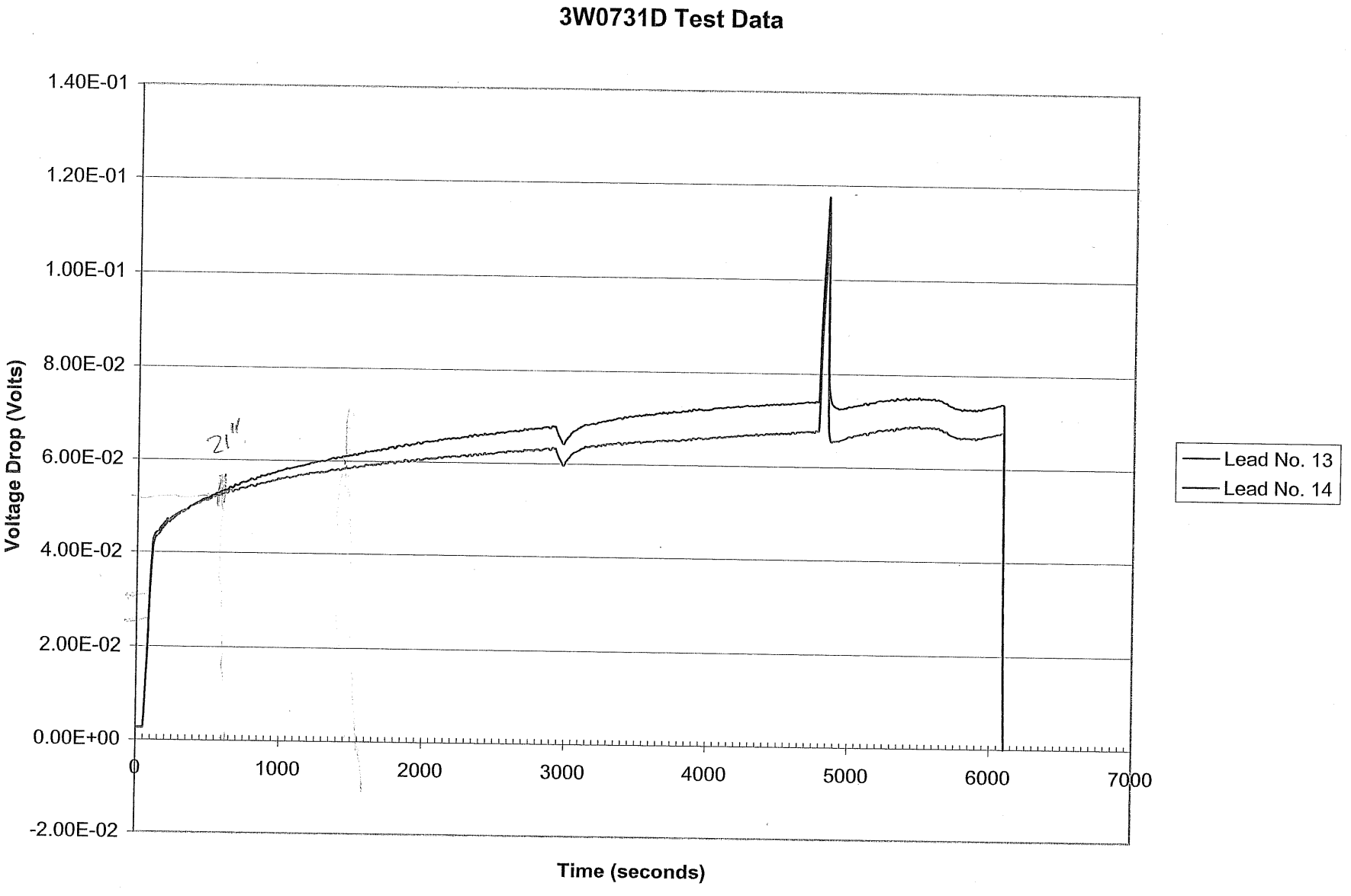

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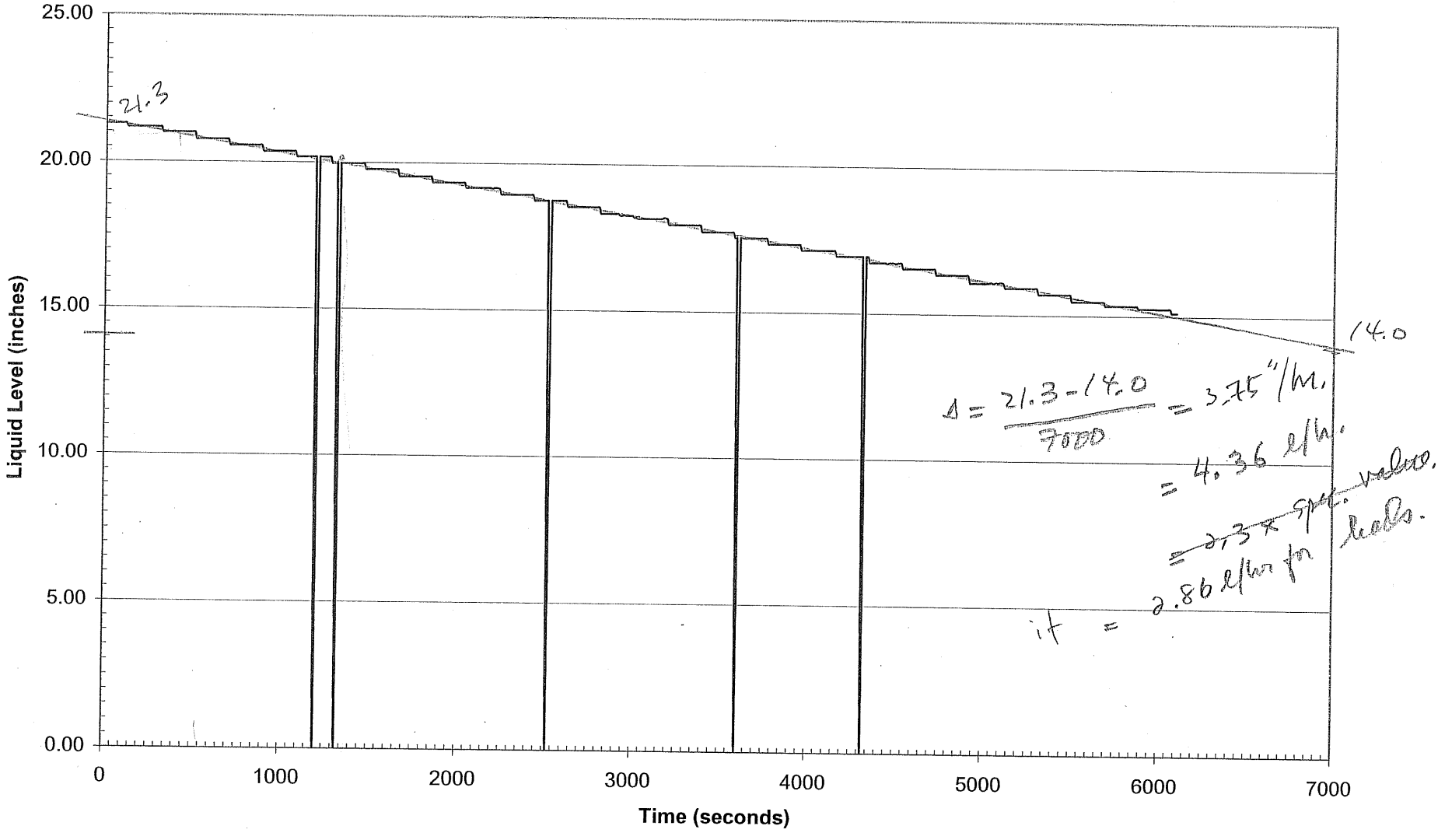
3W0731D Helium Consumption



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To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5310	**Pages:**	~~10~~ 13
Phone:		**Date:**	11/13/03
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

3W0825A	120 Amp 5-lead pair cluster
3W0825B	600 Amp 3-lead pair cluster
3W0825C	600 Amp 3-lead pair cluster
3W0825D	600 Amp 1-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0825 A Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			
	Dimension A		8-28-03	JACK
	Lead #1 5 47/64			
	Lead #2 5 45/64			
	Lead #3 5 47/64			
	Lead #4 5 47/64	5.73		
	Lead #5 5 47/64			
	Lead #6 5 47/64			
	Lead #7 5 47/64			
	Lead #8 5 47/64			
	Lead #9 5 47/64			
	Lead #10 5 3/4	5.75		
	Dimension B		8-28-03	JACK
	Lead #1 9 41/64			
	Lead #2 9 5/8	9.64		
	Lead #3 9 41/64			
	Lead #4 9 5/8			
	Lead #5 9 41/64			
	Lead #6 9 5/8			
	Lead #7 9 5/8			
	Lead #8 9 41/64			
	Lead #9 9 41/64			
	Lead #10 9 41/64			
	Dimension C		8-28-03	JACK
	Lead #1 39 9/64	39.14		
	Lead #2 39 3/16	39.19		
	Lead #3 39 13/64			
	Lead #4 39 3/16			
	Lead #5 39 3/16			
	Lead #6 39 13/64			
	Lead #7 39 3/16			
	Lead #8 39 11/64	39.17		
	Lead #9 39 11/64			
	Lead #10 39 3/16			

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Test #	Test Title		Date	Technician
	Dimension D			
Lead #1	31 1/4	31.25	8-28-03	JACK
Lead #2	31 17/64	31.27		
Lead #3	31 1/4			
Lead #4	31 1/4			
Lead #5	31 17/64			
Lead #6	31 9/32	31.28		
Lead #7	31 9/32			
Lead #8	31 17/64			
Lead #9	31 9/32			
Lead #10	31 1/4			
	Dimension E			
Lead #1	6		8-28-03	JACK
Lead #2	6			
Lead #3	6			
Lead #4	6			
Lead #5	6			
Lead #6	6			
Lead #7	6			
Lead #8	6			
Lead #9	6			
Lead #10	6			
Dimension F	5.140 ✓		8-28-03	JACK
	Dimension G			
Lead #1	1/64		8-28-03	JACK
Lead #2	0			
Lead #3	0			
Lead #4	1/64			
Lead #5	0			
Lead #6	1/64			
Lead #7	0			
Lead #8	1/64			
Lead #9	1/64			
Lead #10	0			
Dimension H	.003		8-28-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	8-27-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	8-28-03	RF
	Leak rate achieved?	1.2×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	8-28-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	9-4-03	GB
	Isolation voltage achieved			
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	9-4-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer _____

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0825B Dwg and Rev Number

Test #	Test Title		Date	Technician
1	Dimensional Check			
	Dimension A		8-28-03	JACK
	Lead #1 4 57/64			
	Lead #2 4 7/8	4.88		
	Lead #3 4 57/64			
	Lead #4 4 57/64			
	Lead #5 4 57/64			
	Lead #6 4 57/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension B		8-28-03	JACK
	Lead #1 9 21/32	9.65		
	Lead #2 9 21/32			
	Lead #3 9 21/32			
	Lead #4 9 21/32			
	Lead #5 9 21/32			
	Lead #6 9 47/64	9.67		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension C		8-28-03	JACK
	Lead #1 39 1/8	39.12		
	Lead #2 39 5/32			
	Lead #3 39 5/32	39.16		
	Lead #4 39 9/64			
	Lead #5 39 5/32			
	Lead #6 39 1/8			
	Lead			
	Lead			
	Lead			
	Lead			

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Test #	Test Title		Date	Technician
	Dimension D ✓			
	Lead #1 30 9/32	30.28	8-28-03	JACK
	Lead #2 30 9/32			
	Lead #3 30 19/64	30.30		
	Lead #4 30 19/64			
	Lead #5 30 9/32			
	Lead #6 30 9/32			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E ✓			
	Lead #1 6		8-28-03	JACK
	Lead #2 6			
	Lead #3 6			
	Lead #4 6			
	Lead #5 6			
	Lead #6 6			
	Lead			
	Lead			
	Lead			
	Dimension F ✓ 5 1/16		8-28-03	JACK
	Dimension G ✓			
	Lead #1 0		8-28-03	JACK
	Lead #2 0			
	Lead #3 1/64			
	Lead #4 1/64			
	Lead #5 0			
	Lead #6 1/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H .006 ✓		8-28-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	8-26-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	8-27-03	RF
	Leak rate achieved?	1.2×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	8-27-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	9-5-03	G.B.
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	10-9-03	G.B.
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer _____

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0825 C Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #7	4 57/64	4.89	8-28-03 JACK
Lead #8	4 57/64		
Lead #9	4 57/64		
Lead #10	4 57/64		
Lead #11	4 57/64		
Lead #12	4 57/64		
Lead			
Lead			
Lead			
Lead			

Dimension B

Lead #7	9 21/32	9.66	8-28-03 JACK
Lead #8	9 21/32		
Lead #9	9 21/32		
Lead #10	9 21/32		
Lead #11	9 21/32		
Lead #12	9 21/32		
Lead			
Lead			
Lead			
Lead			

Dimension C

Lead #7	39 5/32	39.16	8-28-03 JACK
Lead #8	39 11/64	39.17	
Lead #9	39 1/8	39.12	
Lead #10	39 9/64	39.14	
Lead #11	39 1/8		
Lead #12	39 3/16	39.188	
Lead			
Lead			
Lead			
Lead			

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Test #	Test Title		Date	Technician
	Dimension D			
Lead #7	30 9/32	30.28	8-28-03	JACK
Lead #8	30 5/16	30.31		
Lead #9	30 5/16			
Lead #10	30 9/32			
Lead #11	30 9/32			
Lead #12	30 9/32			
Lead				
Lead				
Lead				
Lead				
	Dimension E			
Lead #7	6		8-28-03	JACK
Lead #8	6			
Lead #9	6			
Lead #10	6			
Lead #11	6			
Lead #12	6			
Lead				
Lead				
Lead				
Lead				
Dimension F	5.080		8-28-03	JACK
	Dimension G			
Lead #7	0		8-28-03	JACK
Lead #8	0			
Lead #9	1/64			
Lead #10	1/64			
Lead #11	0			
Lead #12	1/64			
Lead				
Lead				
Lead				
Lead				
Dimension H	.007		8-28-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	8-28-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	8-29-03	RF
	Leak rate achieved?	1.1×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	8-29-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	10-13-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	10-14-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer _____

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0825 D Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			
	Dimension A			
	Lead #13	4 57/64 4.89	8-28-03	JACK
	Lead #14	4 57/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension B			
	Lead #13	9 21/32 9.66	8-28-03	JACK
	Lead #14	9 21/32		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension C			
	Lead #13	39 1/2	8-28-03	JACK
	Lead #14	39 9/64 39.14		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #13 30 9/32	30.28	8-28-03	JACK
	Lead #14 30 9/32			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #13 6		8-28-03	JACK
	Lead #14 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F		8-28-03	JACK
	Dimension G			
	Lead #13 0		8-28-03	JACK
	Lead #14 1/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.004	8-28-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	8-29-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	9-2-03	RF
	Leak rate achieved?	1×10^{-10}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	9-2-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	9-9-03	GB
	Isolation voltage achieved	600 V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	10-8-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer _____

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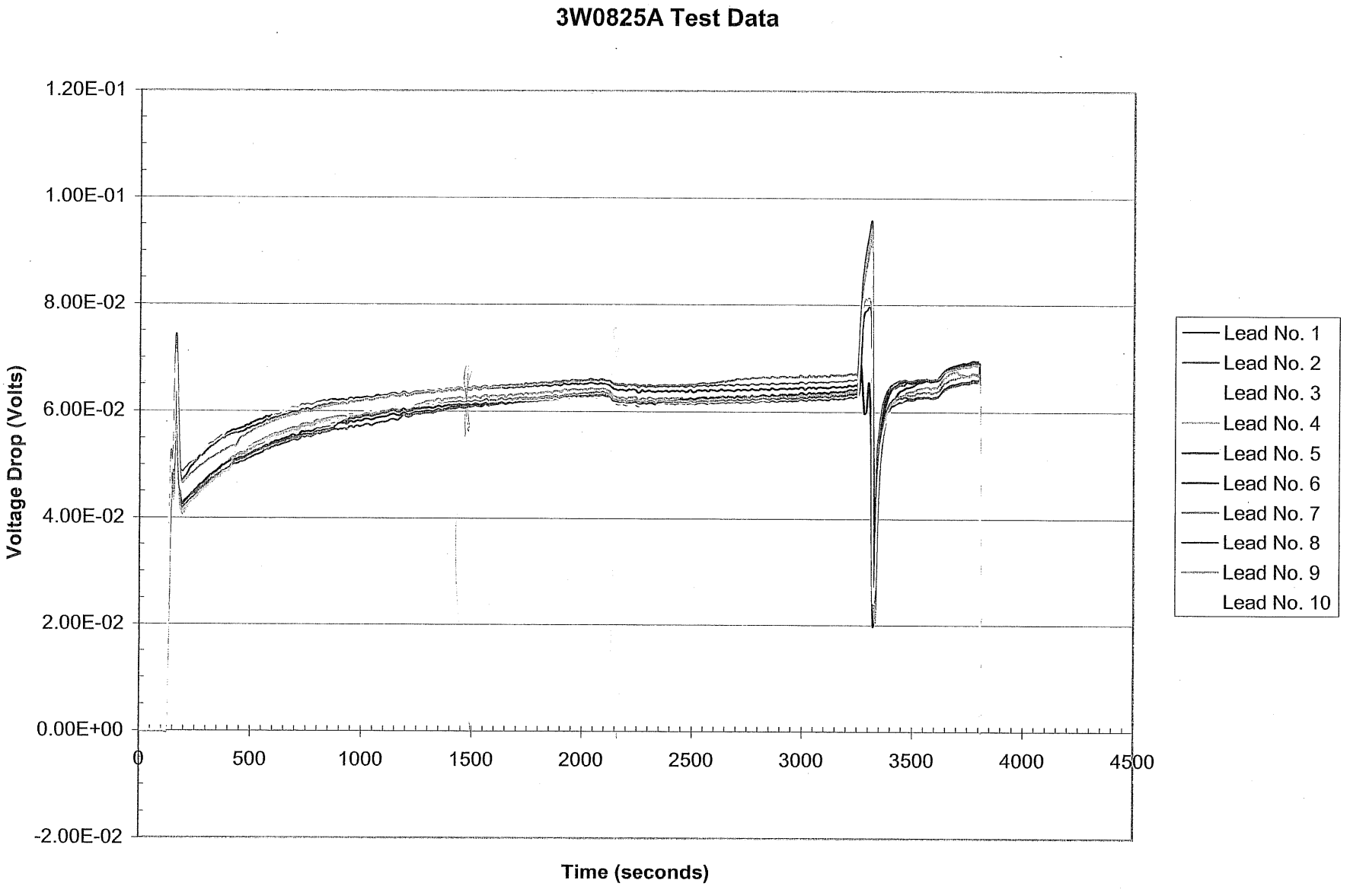

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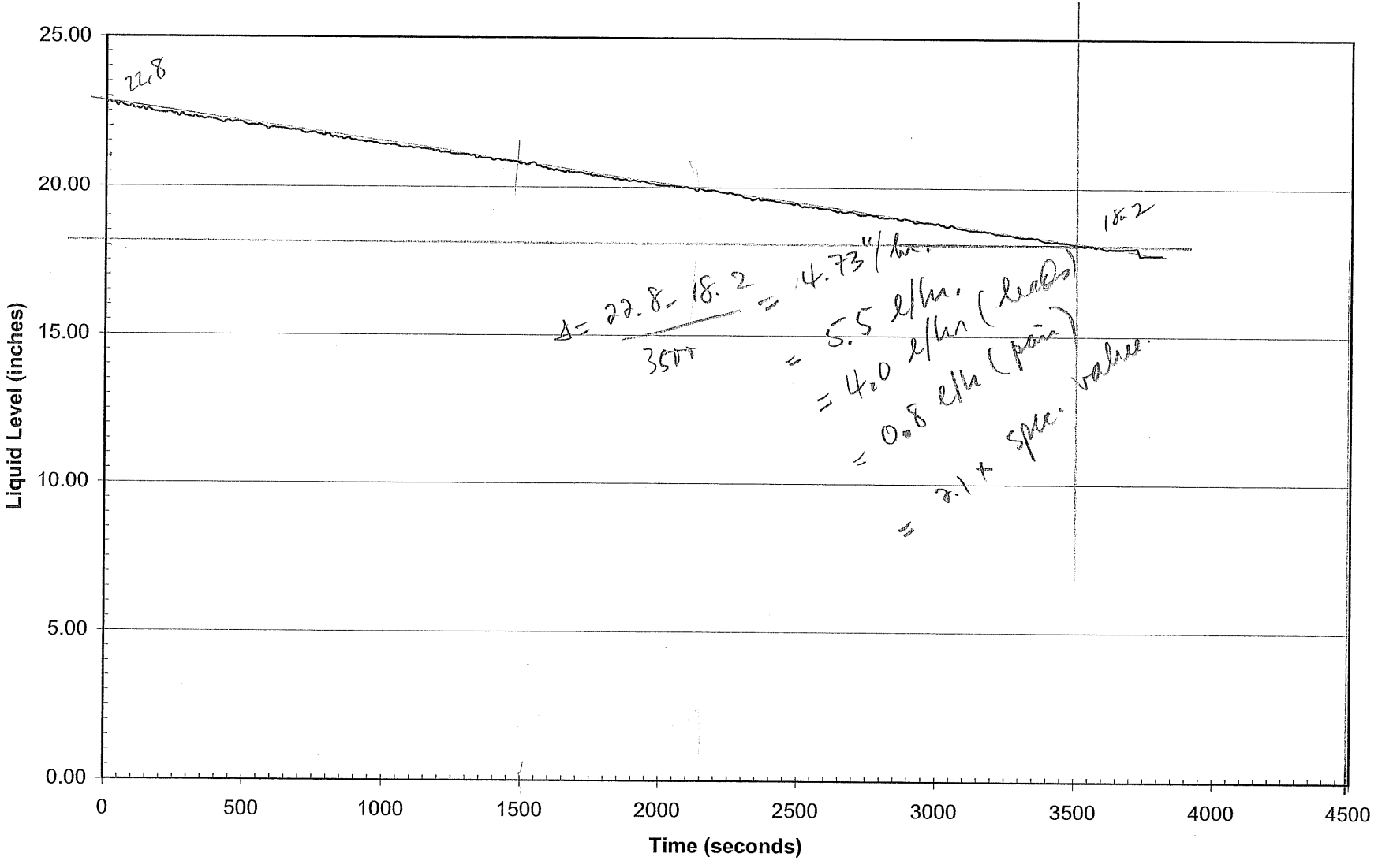
3W0825A Helium Consumption



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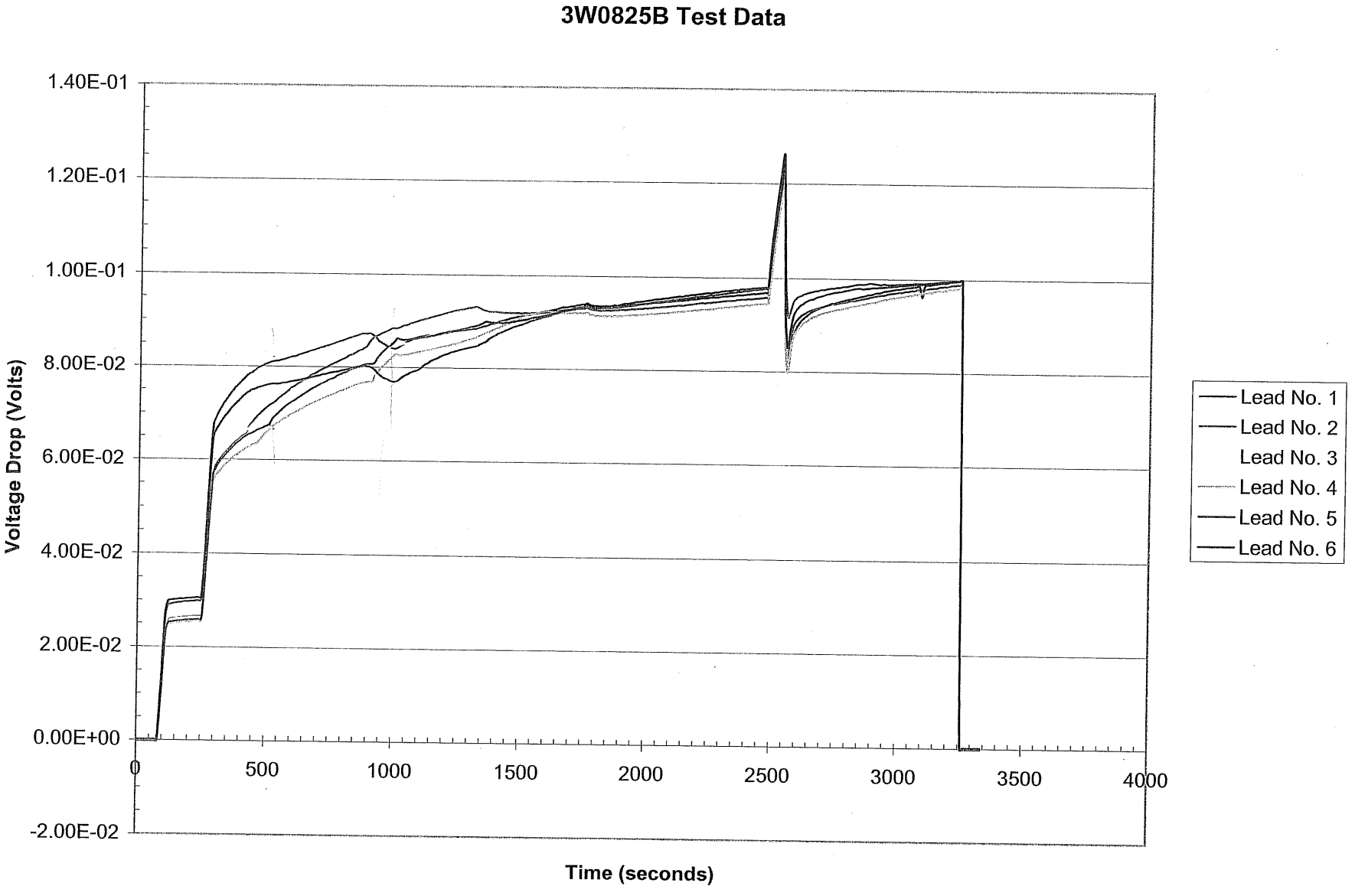

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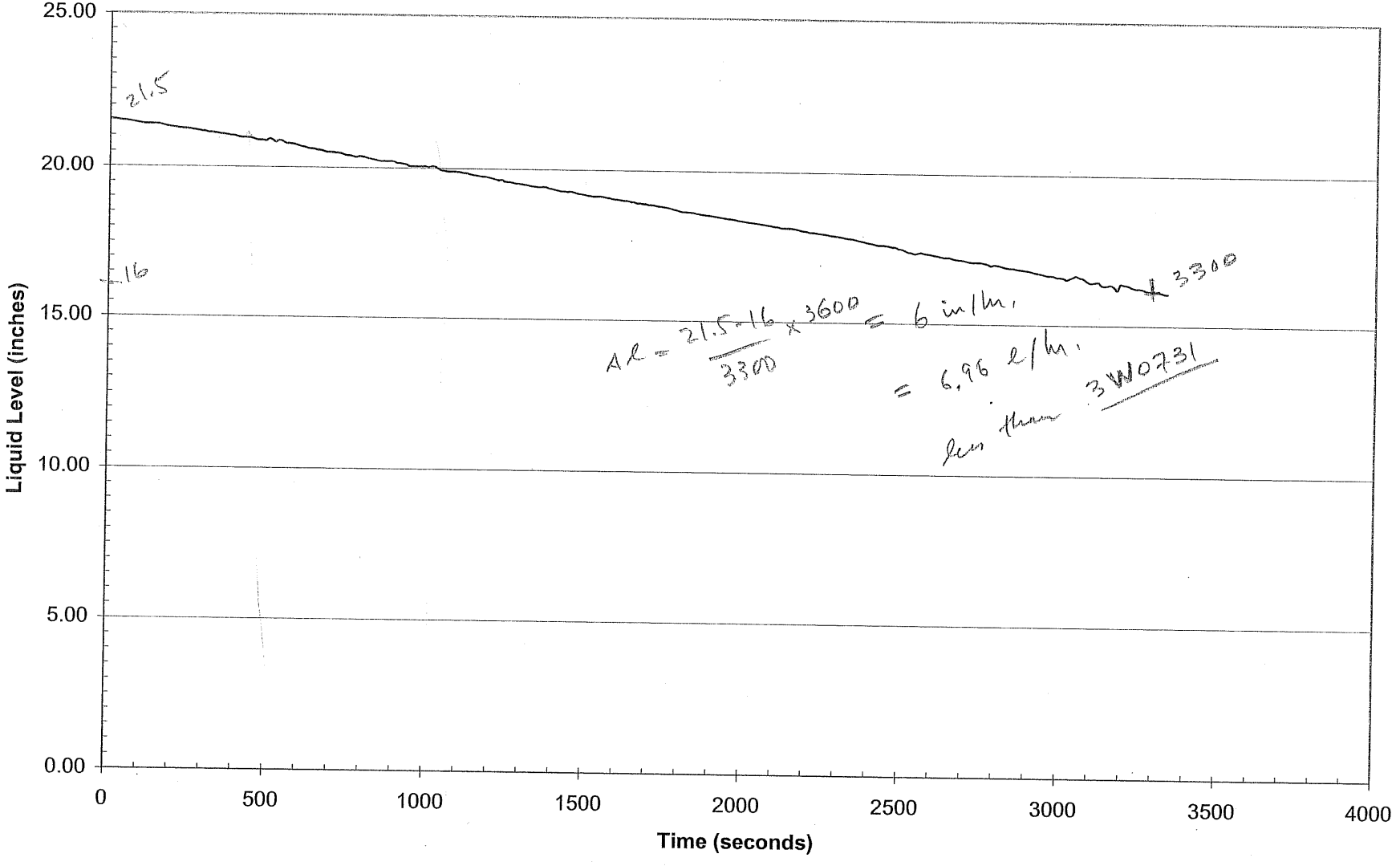
3W0825B Helium Consumption



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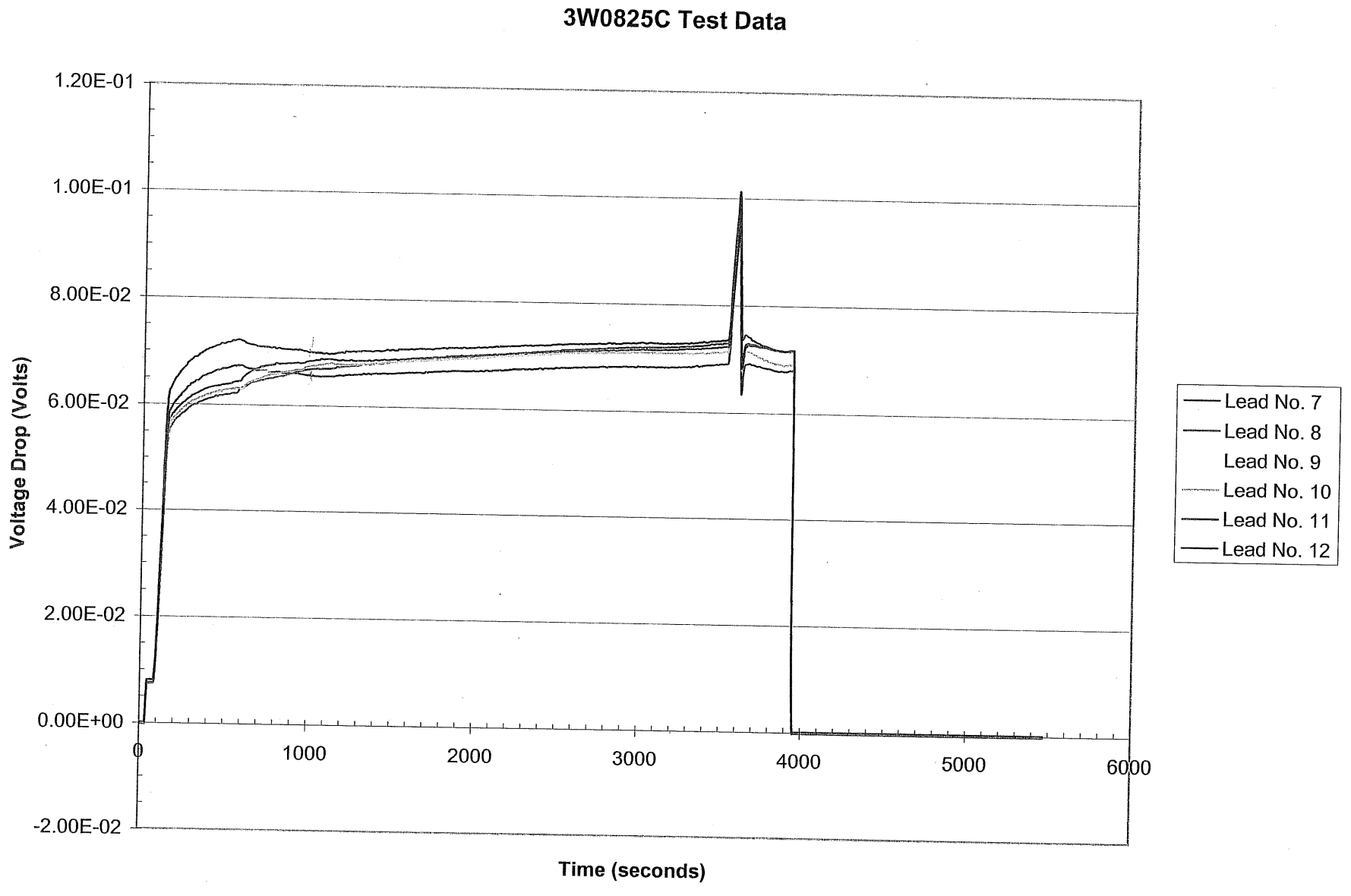

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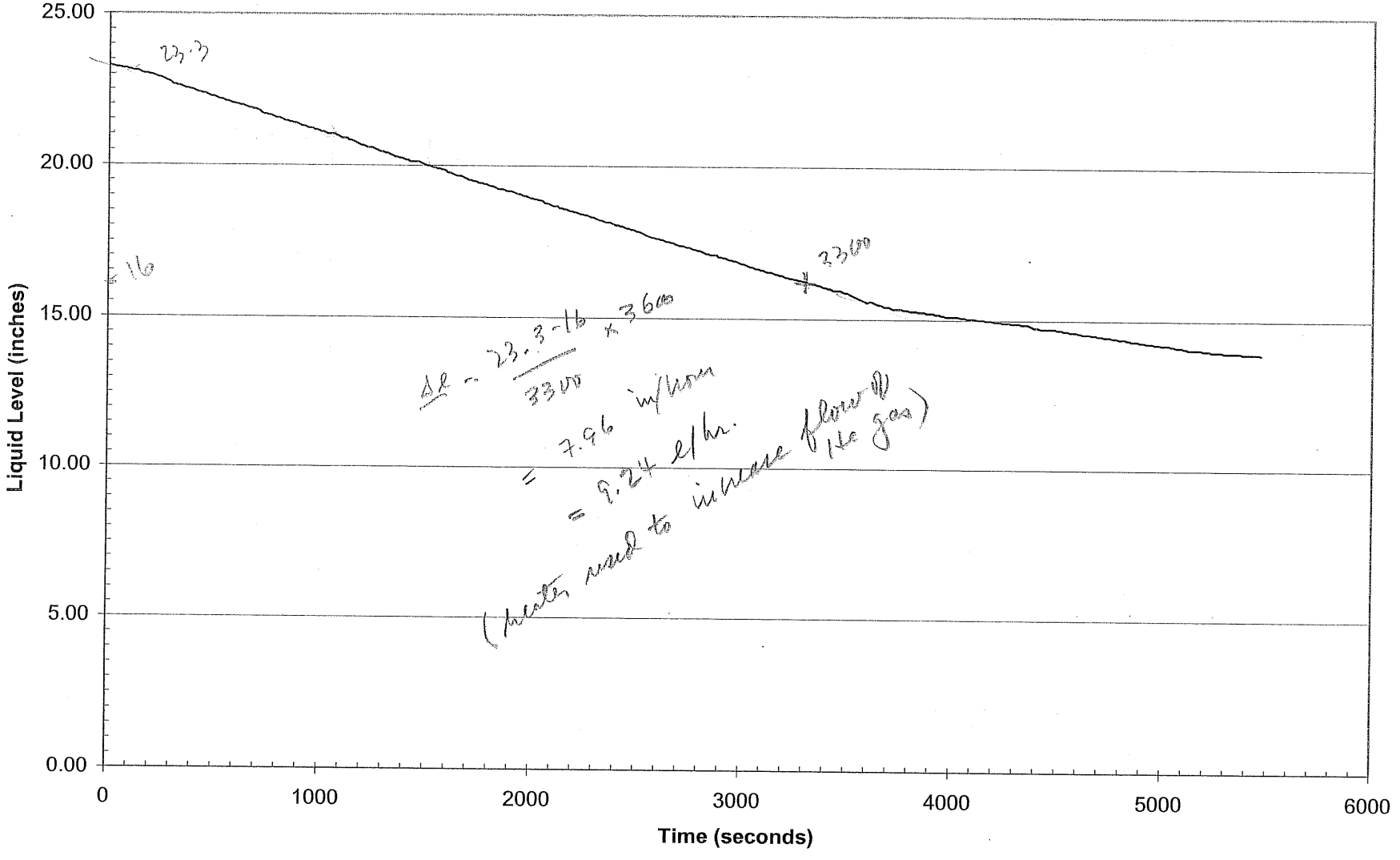
3W0825C Helium Consumption



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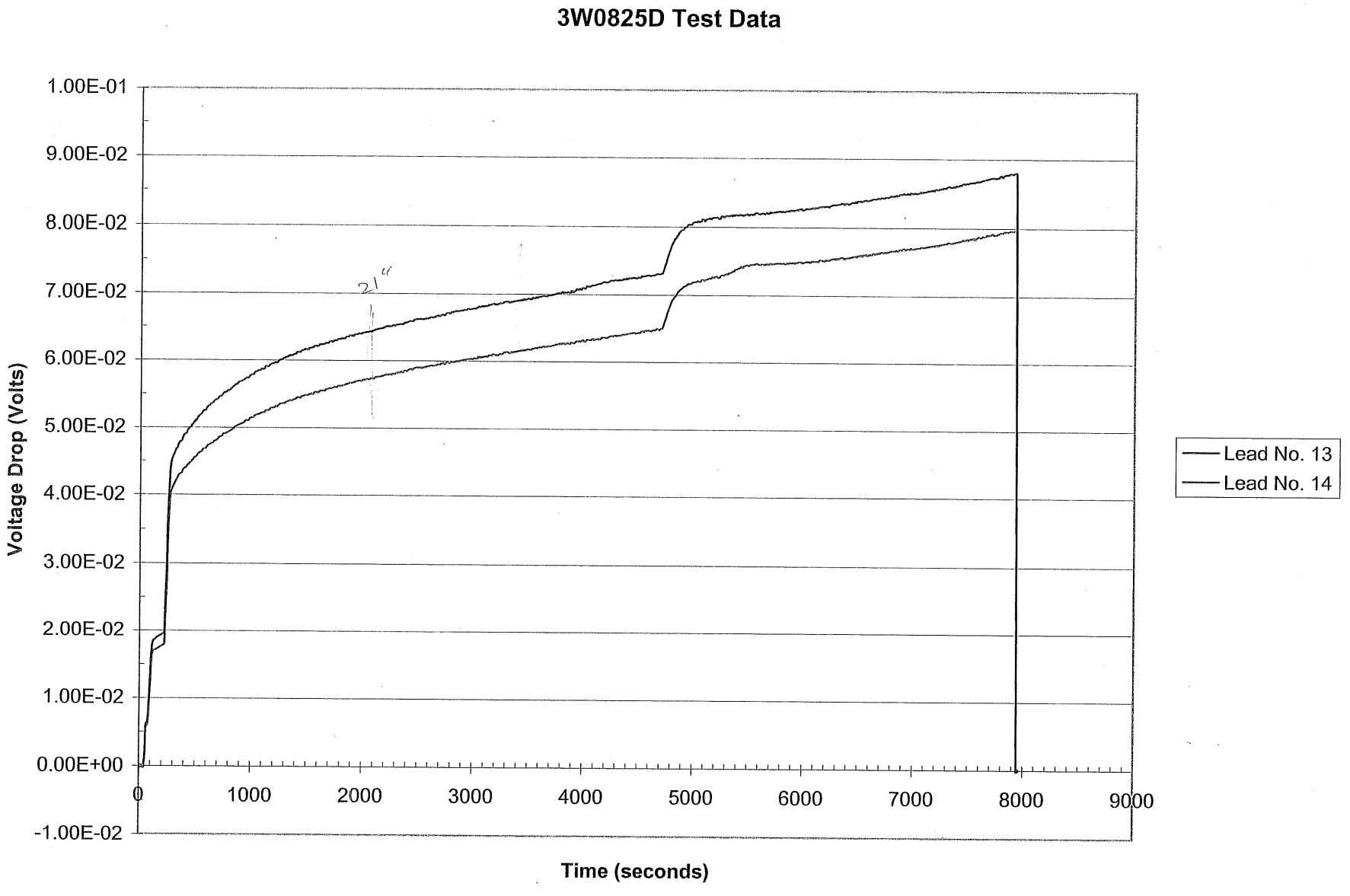

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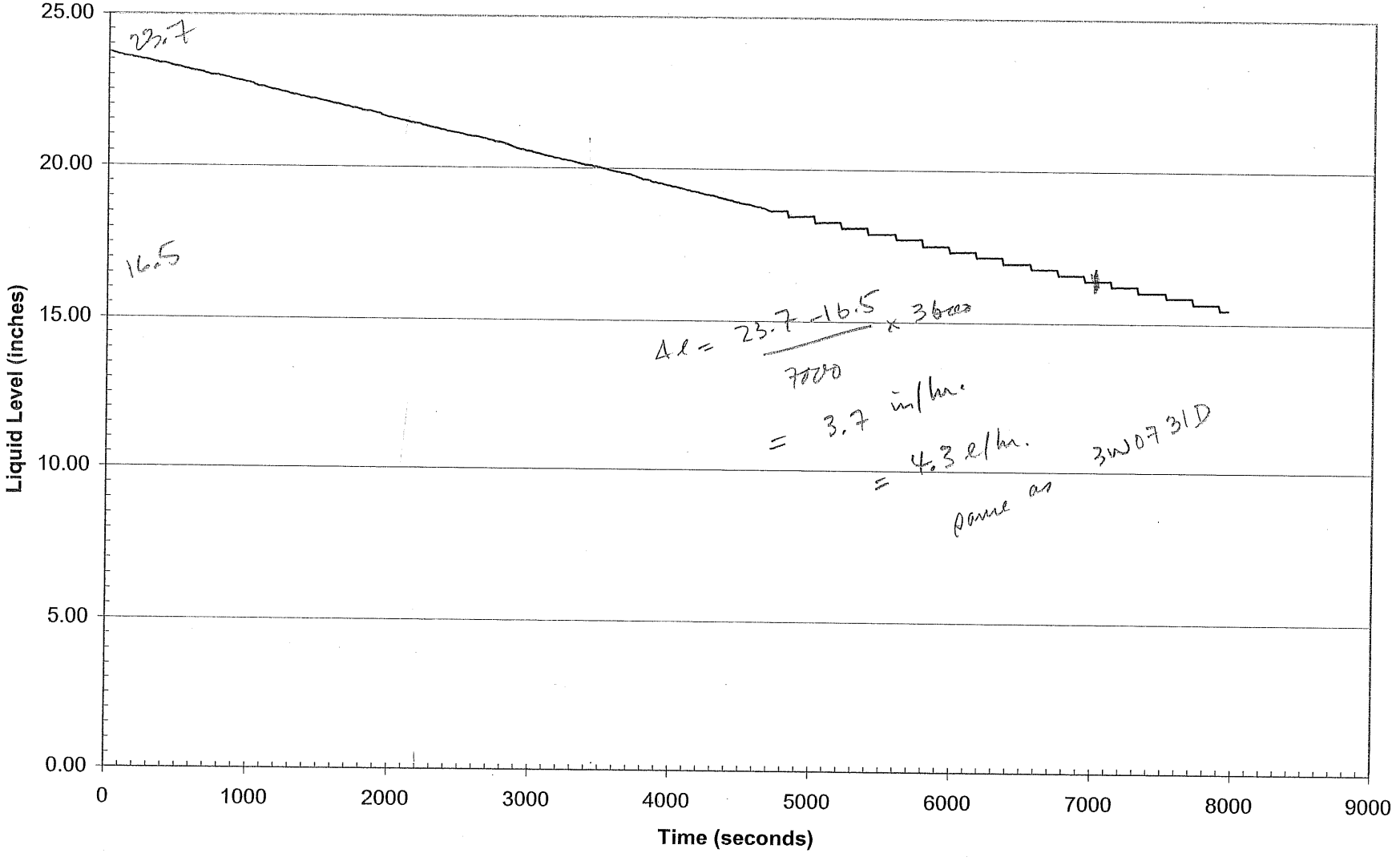
3W0825D Helium Consumption



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Oak Ridge, TN 37831-2509
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To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5310	**Pages:**	13
Phone:		**Date:**	11/13/03
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

3W0909A	120 Amp 5-lead pair cluster
3W0909B	600 Amp 3-lead pair cluster
3W0909C	600 Amp 3-lead pair cluster
3W0909D	600 Amp 1-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0909A Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #1	5	45/64	5.70	9-25-03	JACK
Lead #2	5	23/32			
Lead #3	5	47/64			
Lead #4	5	23/32			
Lead #5	5	23/32			
Lead #6	5	47/64	5.73		
Lead #7	5	47/64			
Lead #8	5	23/32			
Lead #9	5	23/32			
Lead #10	5	23/32			

Dimension B

Lead #1	9	39/64	9.61	9-25-03	JACK
Lead #2	9	5/8	9.62		
Lead #3	9	5/8			
Lead #4	9	5/8			
Lead #5	9	5/8			
Lead #6	9	5/8			
Lead #7	9	41/64	9.64		
Lead #8	9	5/8			
Lead #9	9	39/64			
Lead #10	9	5/8			

Dimension C

Lead #1	39	13/64	39.20	9-25-03	JACK
Lead #2	39	13/64	39.20		
Lead #3	39	13/64			
Lead #4	39	13/64			
Lead #5	39	13/64			
Lead #6	39	13/64			
Lead #7	39	3/16	39.188		
Lead #8	39	13/64			
Lead #9	39	13/64			
Lead #10	39	13/64			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1 31 17/64	31.27	9-25-03	JACK
	Lead #2 31 17/64			
	Lead #3 31 17/64			
	Lead #4 31 17/64			
	Lead #5 31 1/4	31.25		
	Lead #6 31 17/64			
	Lead #7 31 9/32	31.28		
	Lead #8 31 9/32			
	Lead #9 31 1/4			
	Lead #10 31 17/64			
	Dimension E			
	Lead #1 6		9-25-03	JACK
	Lead #2 6			
	Lead #3 6			
	Lead #4 6			
	Lead #5 6			
	Lead #6 6			
	Lead #7 6			
	Lead #8 6			
	Lead #9 6			
	Lead #10 6			
	Dimension F 5 9/64	5.14	9-25-03	JACK
	Dimension G			
	Lead #1 0		9-25-03	JACK
	Lead #2 0			
	Lead #3 0			
	Lead #4 1/64			
	Lead #5 1/64			
	Lead #6 1/64			
	Lead #7 0			
	Lead #8 1/64			
	Lead #9 0			
	Lead #10 0			
	Dimension H .002		9-25-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	9-12-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	9-15-03	RF
	Leak rate achieved?	1.1×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	9-15-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	10-15-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	10-15-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer _____

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0909 B Dwg and Rev Number

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A ✓

Lead #1	4 29/32	4.91	9-25-03	JACK
Lead #2	4 57/64	4.89		
Lead #3	4 57/64			
Lead #4	4 29/32			
Lead #5	4 7/8	4.87		
Lead #6	4 29/32	4.90		
Lead				
Lead				
Lead				
Lead				

Dimension B ✓

Lead #1	9 21/32	9.66	9-25-03	JACK
Lead #2	9 21/32			
Lead #3	9 21/32			
Lead #4	9 21/32			
Lead #5	9 41/64	9.64		
Lead #6	9 21/32			
Lead				
Lead				
Lead				
Lead				

Dimension C ✓

Lead #1	39 3/32	39.09	9-25-03	JACK
Lead #2	39 1/8	39.17		
Lead #3	39 1/8			
Lead #4	39 7/64	39.11		
Lead #5	39 9/64	39.14		
Lead #6	39 1/8			
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1 30 9/32	30.28	9-25-03	JACK
	Lead #2 30 9/32			
	Lead #3 30 19/64			
	Lead #4 30 19/64	30.80		
	Lead #5 30 9/32			
	Lead #6 30 9/32			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #1 6		9-25-03	JACK
	Lead #2 6			
	Lead #3 6			
	Lead #4 6			
	Lead #5 6			
	Lead #6 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F 5 5/64	5.08	9-25-03	JACK
	Dimension G			
	Lead #1 1/64		9-25-03	JACK
	Lead #2 0			
	Lead #3 1/64			
	Lead #4 0			
	Lead #5 0			
	Lead #6 0			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H .003		9-25-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	9-10-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	9-11-03	RF
	Leak rate achieved?	1×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	9-11-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	10-17-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail		
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0909C Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #7	4 57/64	4.89	9-25-03 JACK
Lead #8	4 57/64		
Lead #9	4 57/64		
Lead #10	4 57/64		
Lead #11	4 29/32	4.90	
Lead #12	4 57/64		
Lead			
Lead			
Lead			
Lead			

Dimension B

Lead #7	9 21/32	9.66	9-25-03 JACK
Lead #8	9 21/32		
Lead #9	9 21/32		
Lead #10	9 21/32		
Lead #11	9 21/32		
Lead #12	9 21/32		
Lead			
Lead			
Lead			
Lead			

Dimension C

Lead #7	39 9/64	39.14	9-25-03 JACK
Lead #8	39 9/64		
Lead #9	39 1/8	39.12	
Lead #10	39 1/8		
Lead #11	39 5/32	39.16	
Lead #12	39 1/8		
Lead			
Lead			
Lead			
Lead			

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Test #	Test Title		Date	Technician
	Dimension D			
Lead #7	30 9/32	30.28	9-25-03	JACK
Lead #8	30 19/64	30.30		
Lead #9	30 19/64			
Lead #10	30 19/64			
Lead #11	30 19/64			
Lead #12	30 19/64			
Lead				
Lead				
Lead				
Lead				
	Dimension E			
Lead #7	6		9-25-03	JACK
Lead #8	6			
Lead #9	5 63/64			
Lead #10	5 63/64			
Lead #11	6			
Lead #12	6			
Lead				
Lead				
Lead				
Lead				
Dimension F	5 1/16		9-25-03	JACK
	Dimension G			
Lead #7	0		9-25-03	JACK
Lead #8	0			
Lead #9	0			
Lead #10	0			
Lead #11	0			
Lead #12	1/64			
Lead				
Lead				
Lead				
Lead				
Dimension H	.006		9-25-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	9-11-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	9-12-03	RF
	Leak rate achieved?	6.4×10^{-10}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	9-12-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	10-16-03	GB
	Isolation voltage achieved	600 V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	10-16-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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Current Lead Test Data Sheet

Current Lead Serial Number 3W0909D Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			
	Dimension A			
	Lead #13 4 57/64	4.89	9-25-03	JACK
	Lead #14 4 57/64			
	Dimension B			
	Lead #13 9 41/64	9.64	9-25-03	JACK
	Lead #14 9 21/32	9.66		
	Dimension C			
	Lead #13 39 9/64	39.14	9-25-03	JACK
	Lead #14 39 1/8	39.13		

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #13 30 5/16	30.31	9-25-03	JACK
	Lead #14 30 19/64	30.30		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #13 6		9-25-03	JACK
	Lead #14 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F		9-25-03	JACK
	Dimension G			
	Lead #13 1/64		9-25-03	JACK
	Lead #14 1/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.003	9-25-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	9-9-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	9-10-03	RF
	Leak rate achieved?	1.2×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	9-10-03	SB
	Isolation voltage achieved	2000/4000		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	11-12-03	GB
	Isolation voltage achieved	600		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail		
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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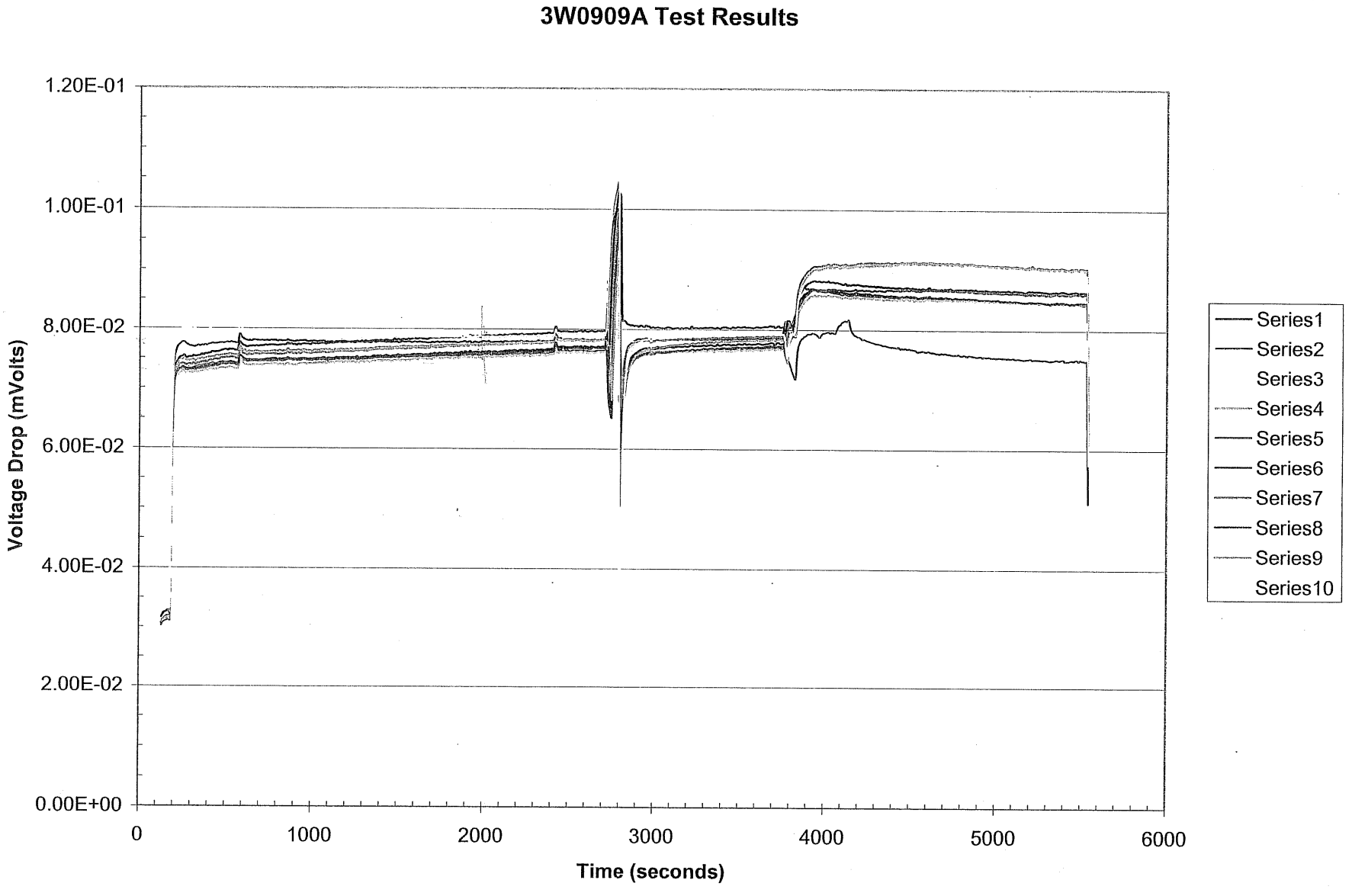

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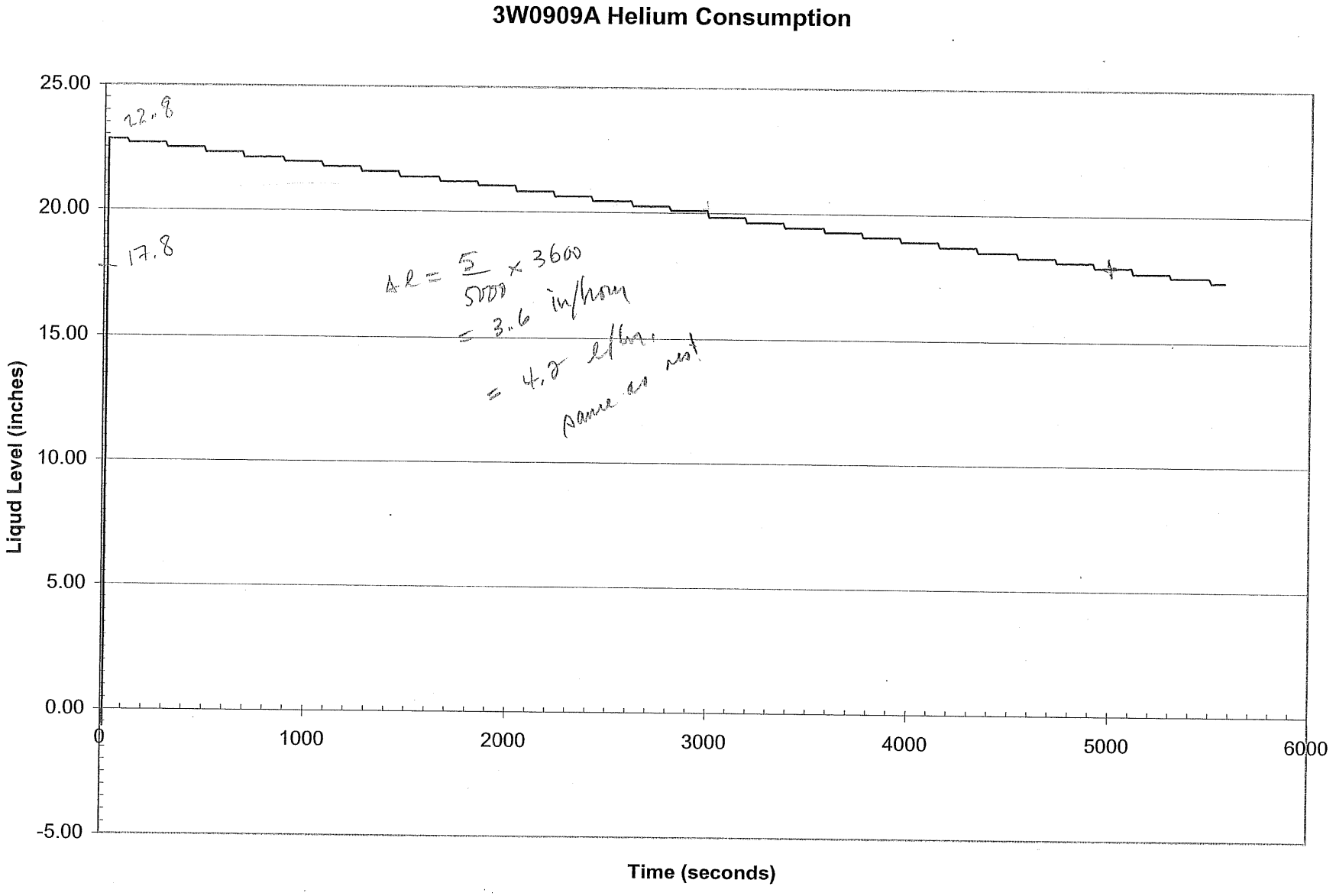

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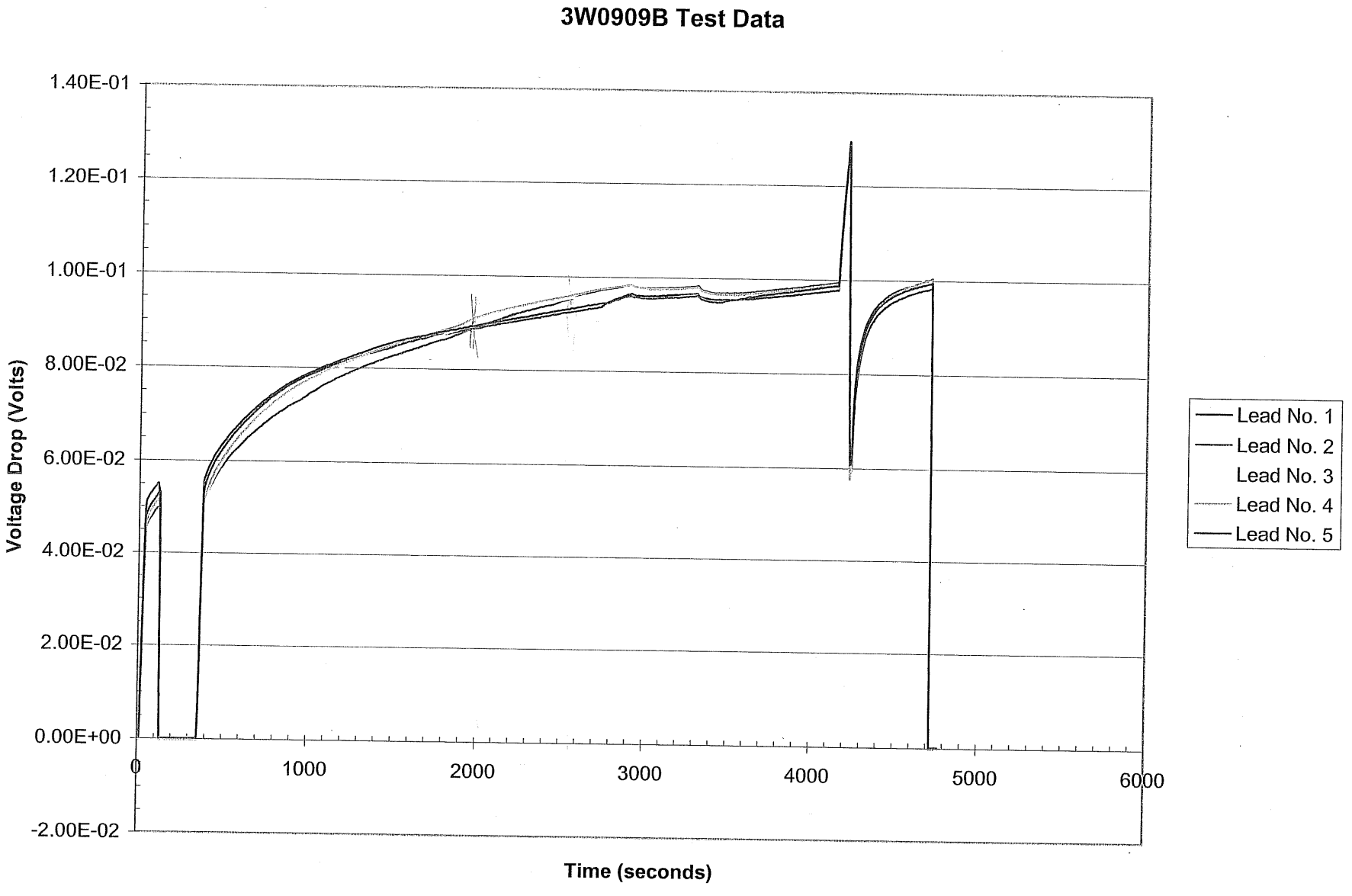

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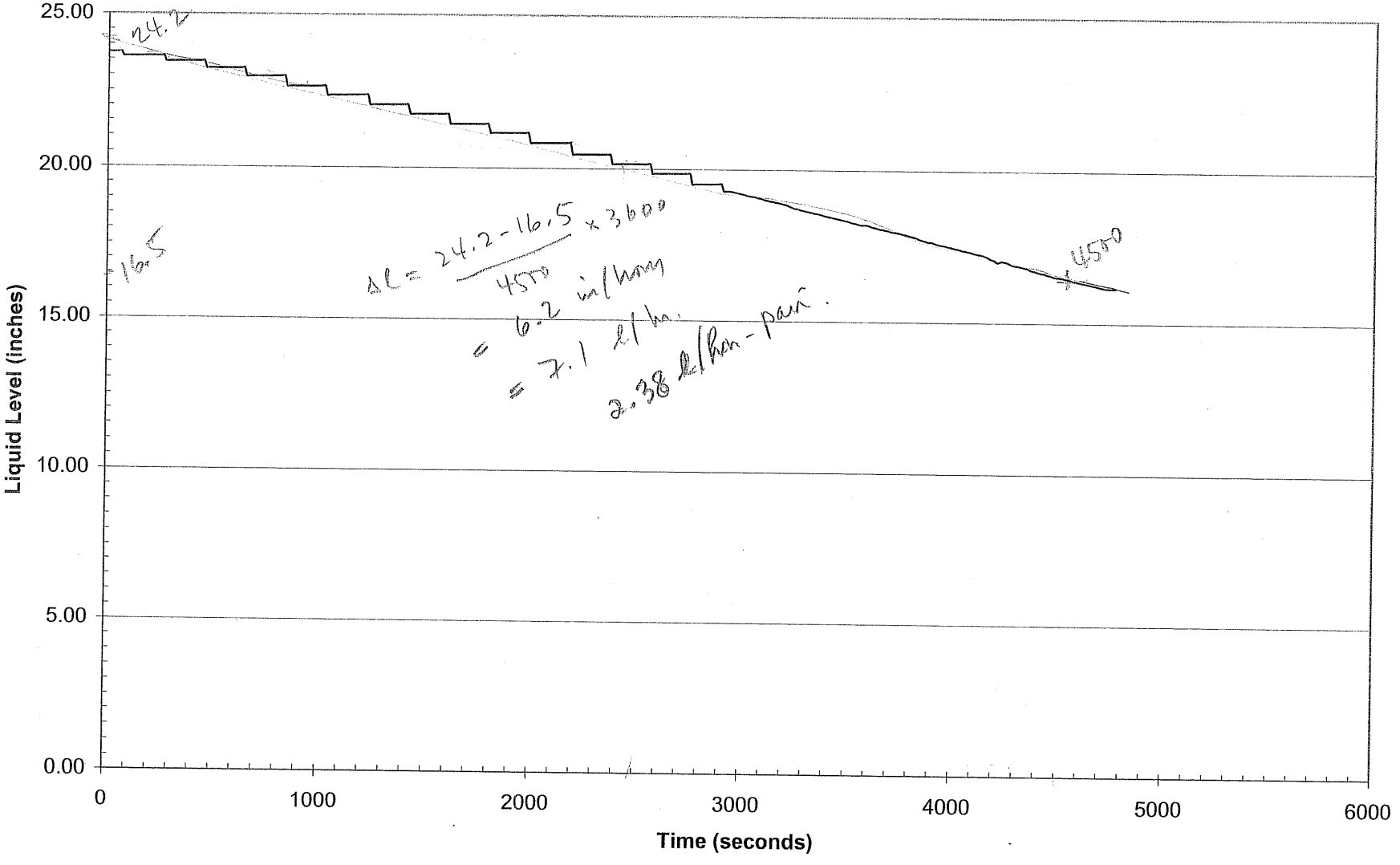

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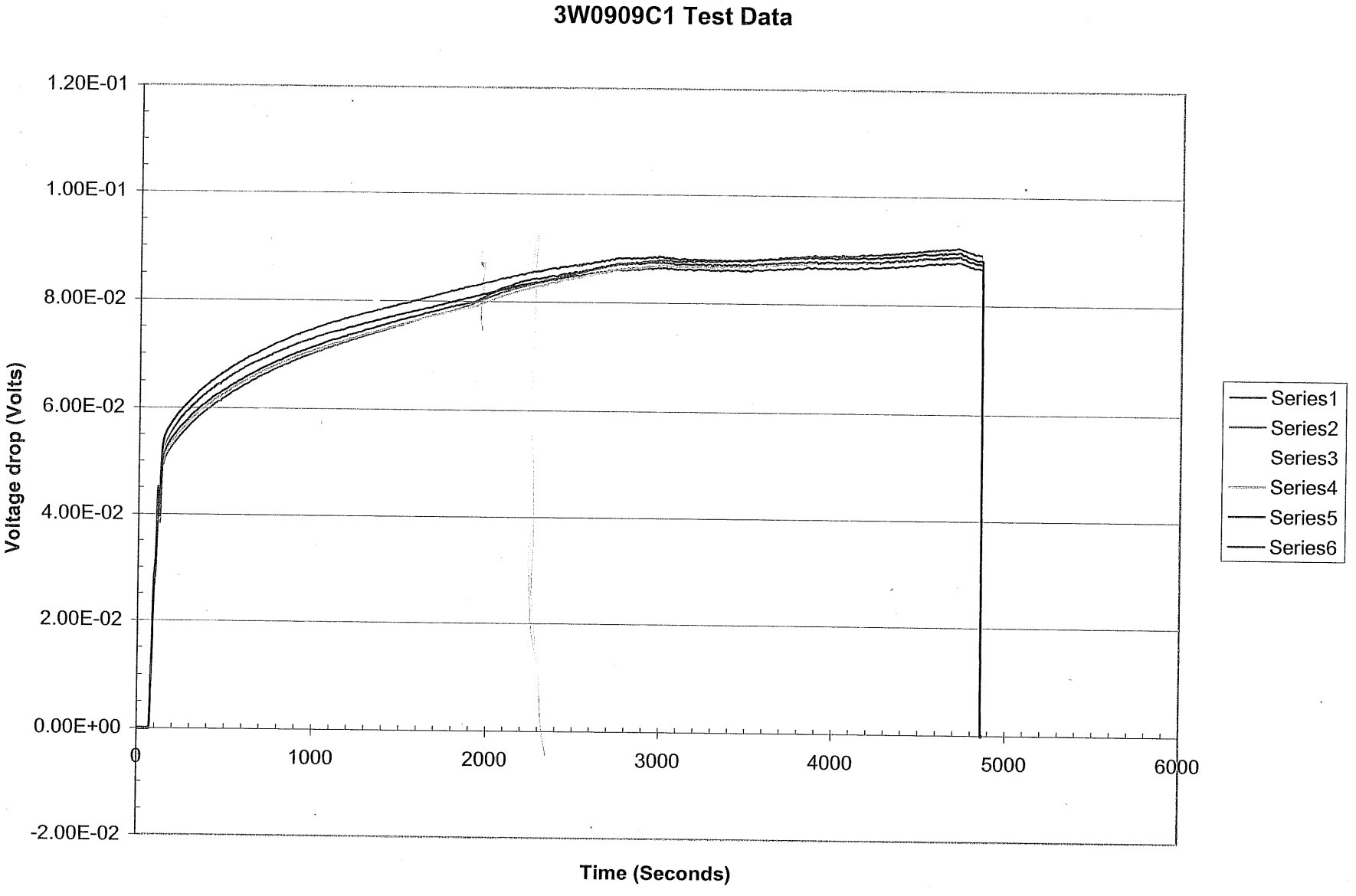

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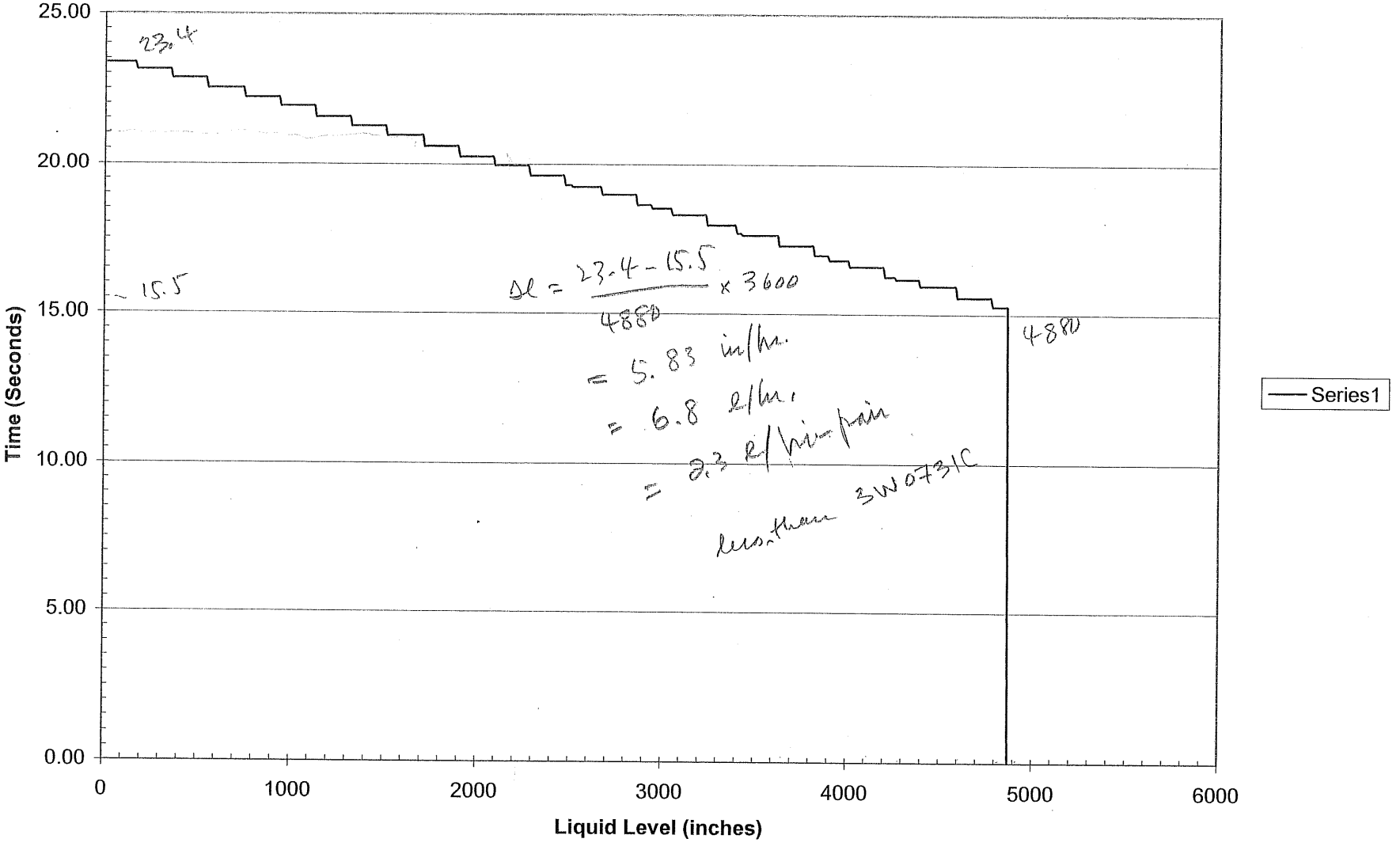
3W0909C1 Helium Consumption



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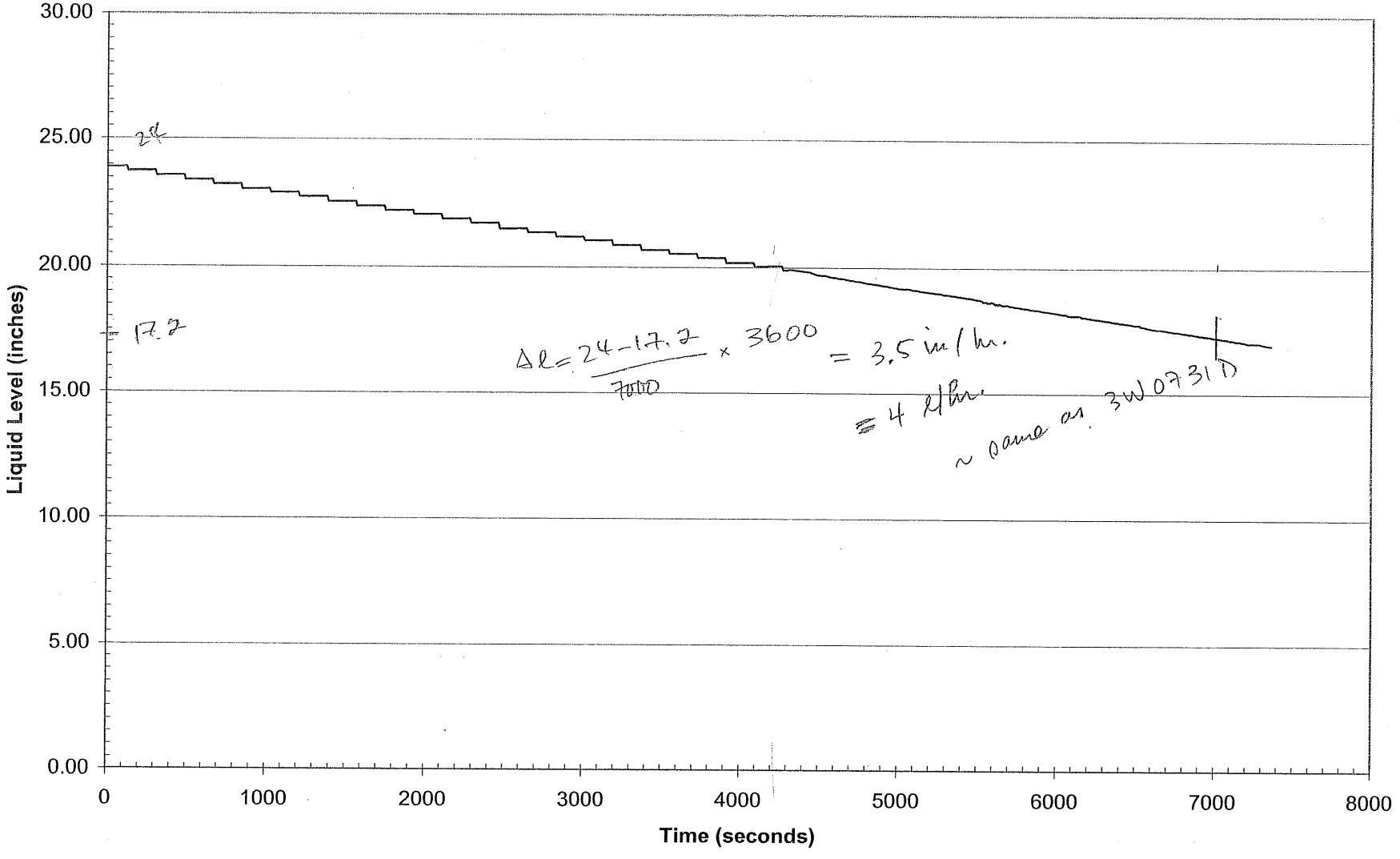
3W0909D Helium Consumption



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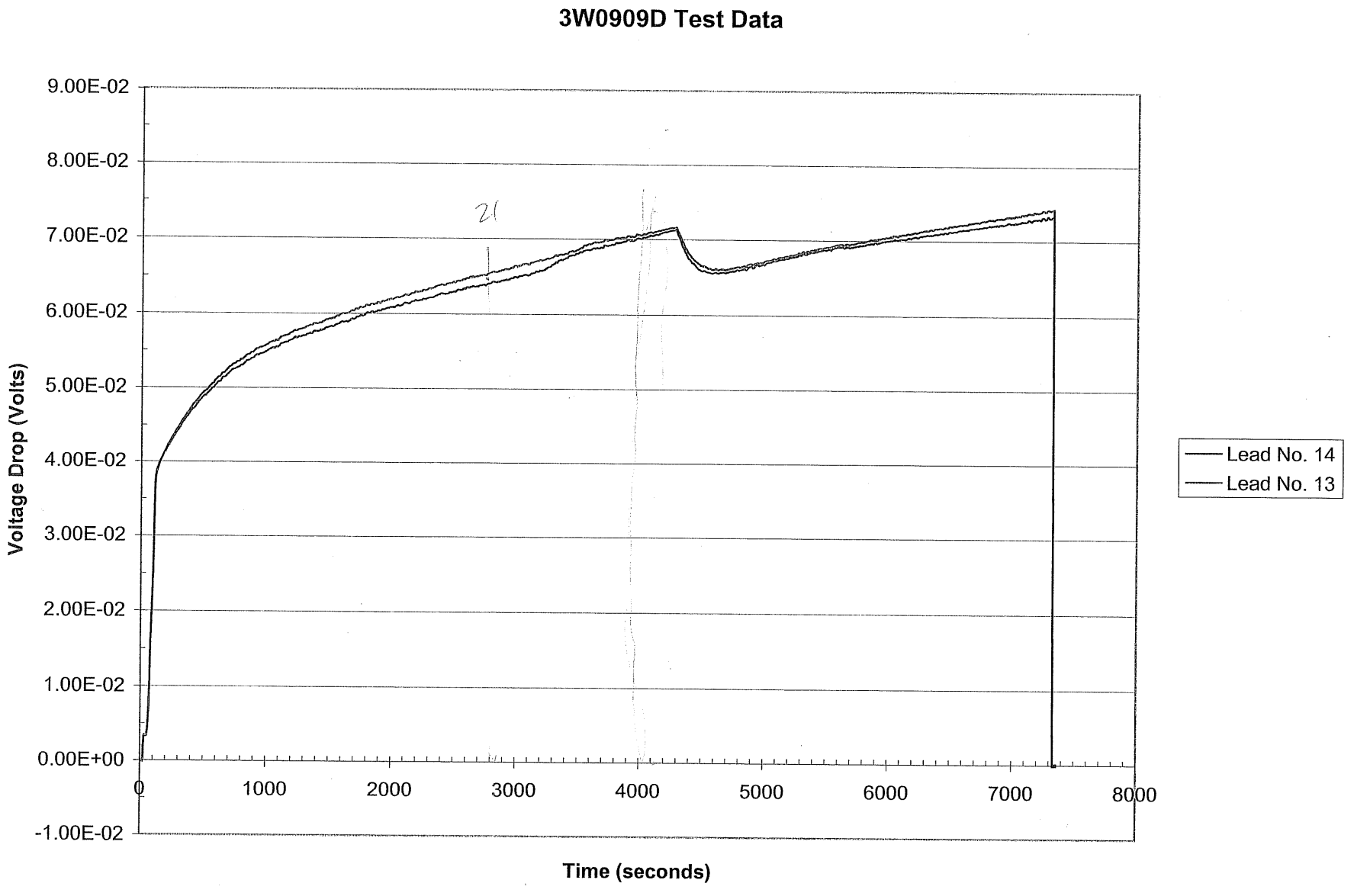

P.O. Box 2509
112 Flint Road
Oak Ridge, TN 37831-2509
Phone: (865) 482-1056 x46
Fax: (865) 482-5472
http://www.americanmagnetics.com

American Magnetics, Inc.

Fax

To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5310	**Pages:**	13
Phone:		**Date:**	12/4/03
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

3W1111A	120 Amp 5-lead pair cluster
3W1111B	600 Amp 3-lead pair cluster
3W1111C	600 Amp 3-lead pair cluster
3W1111D	600 Amp 1-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 3W1111A Dwg and Rev Number _____

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A

Lead #1	5 23/32		11-18-03	JACK
Lead #2	5 23/32			
Lead #3	5 47/64			
Lead #4	5 3/4			
Lead #5	5 23/32	5.72		
Lead #6	5 47/64			
Lead #7	5 23/32			
Lead #8	5 47/64			
Lead #9	5 47/64	5.73		
Lead #10	5 3/4	5.75		

Dimension B

Lead #1	9 39/64	9.61	11-18-03	JACK
Lead #2	9 39/64			
Lead #3	9 39/64			
Lead #4	9 41/64			
Lead #5	9 39/64			
Lead #6	9 41/64			
Lead #7	9 39/64			
Lead #8	9 5/8	9.65		
Lead #9	9 5/8			
Lead #10	9 41/64	9.64		

Dimension C

Lead #1	39 13/64	39.20	11-18-03	JACK
Lead #2	39 3/16			
Lead #3	39 3/16	39.19		
Lead #4	39 11/64	39.17		
Lead #5	39 3/16			
Lead #6	39 3/16			
Lead #7	39 3/16			
Lead #8	39 3/16			
Lead #9	39 3/16			
Lead #10	39 3/16			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1	31 1/4	11-18-03	JACK
	Lead #2	31 1/4		
	Lead #3	31 17/64		
	Lead #4	31 1/4		
	Lead #5	31 1/4		
	Lead #6	31 1/4		
	Lead #7	31 1/4		
	Lead #8	31 1/4		
	Lead #9	31 1/4		
	Lead #10	31 1/4		
	Dimension E			
	Lead #1	6	11-18-03	JACK
	Lead #2	6		
	Lead #3	6		
	Lead #4	6		
	Lead #5	6		
	Lead #6	6		
	Lead #7	6		
	Lead #8	6		
	Lead #9	6		
	Lead #10	6		
	Dimension F	5 9/64	11-18-03	JACK
	Dimension G			
	Lead #1	0	11-18-03	JACK
	Lead #2	0		
	Lead #3	0		
	Lead #4	0		
	Lead #5	1/64		
	Lead #6	1/64		
	Lead #7	1/64		
	Lead #8	0		
	Lead #9	0		
	Lead #10	0		
	Dimension H	00 2	11-18-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-11-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-12-03	RF
	Leak rate achieved?	1×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	11-12-03	BM
	Isolation voltage achieved	2kV/4kV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	12-4-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-4-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer [signature] 12/4/03

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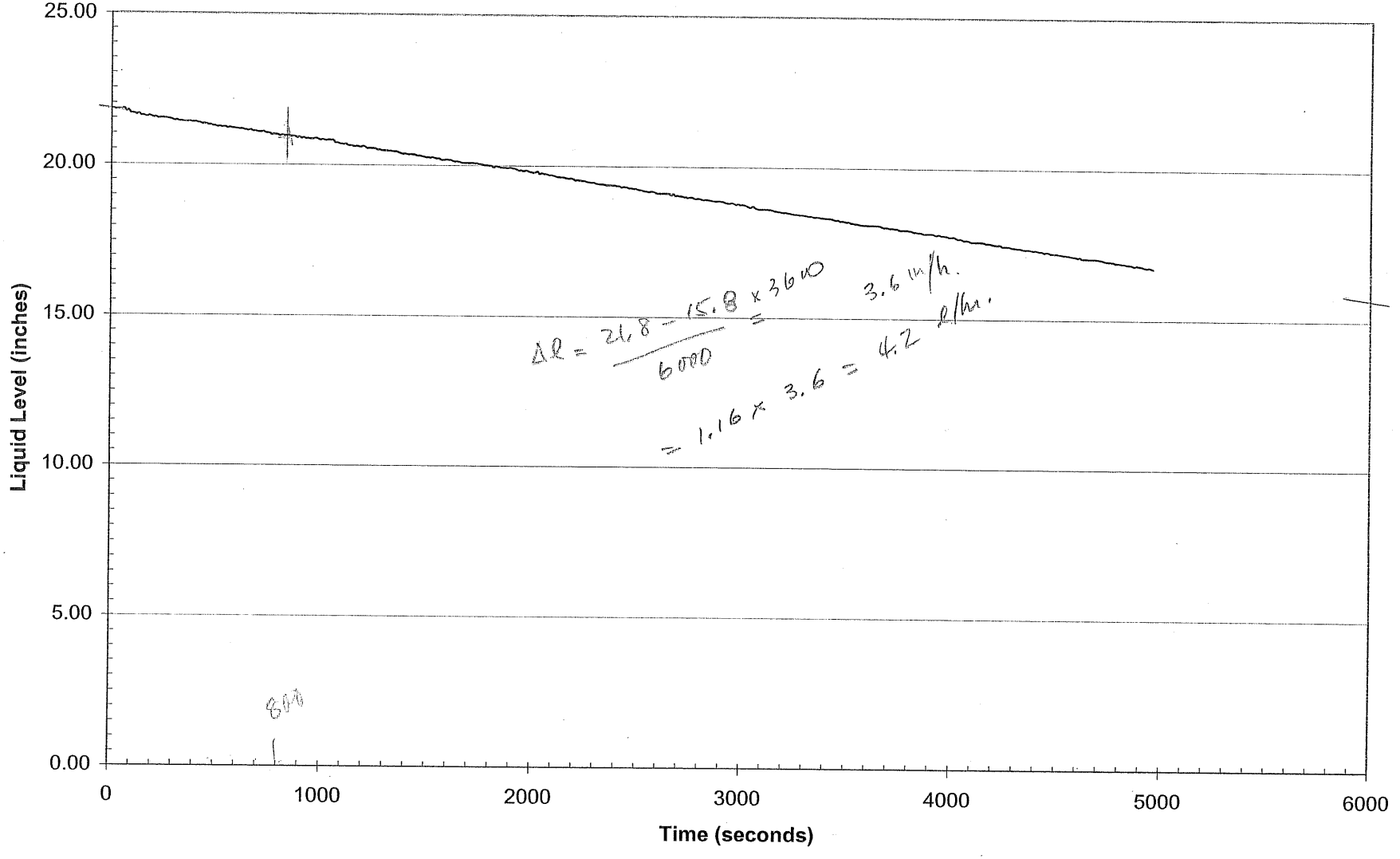
3W1111A Helium Consumption



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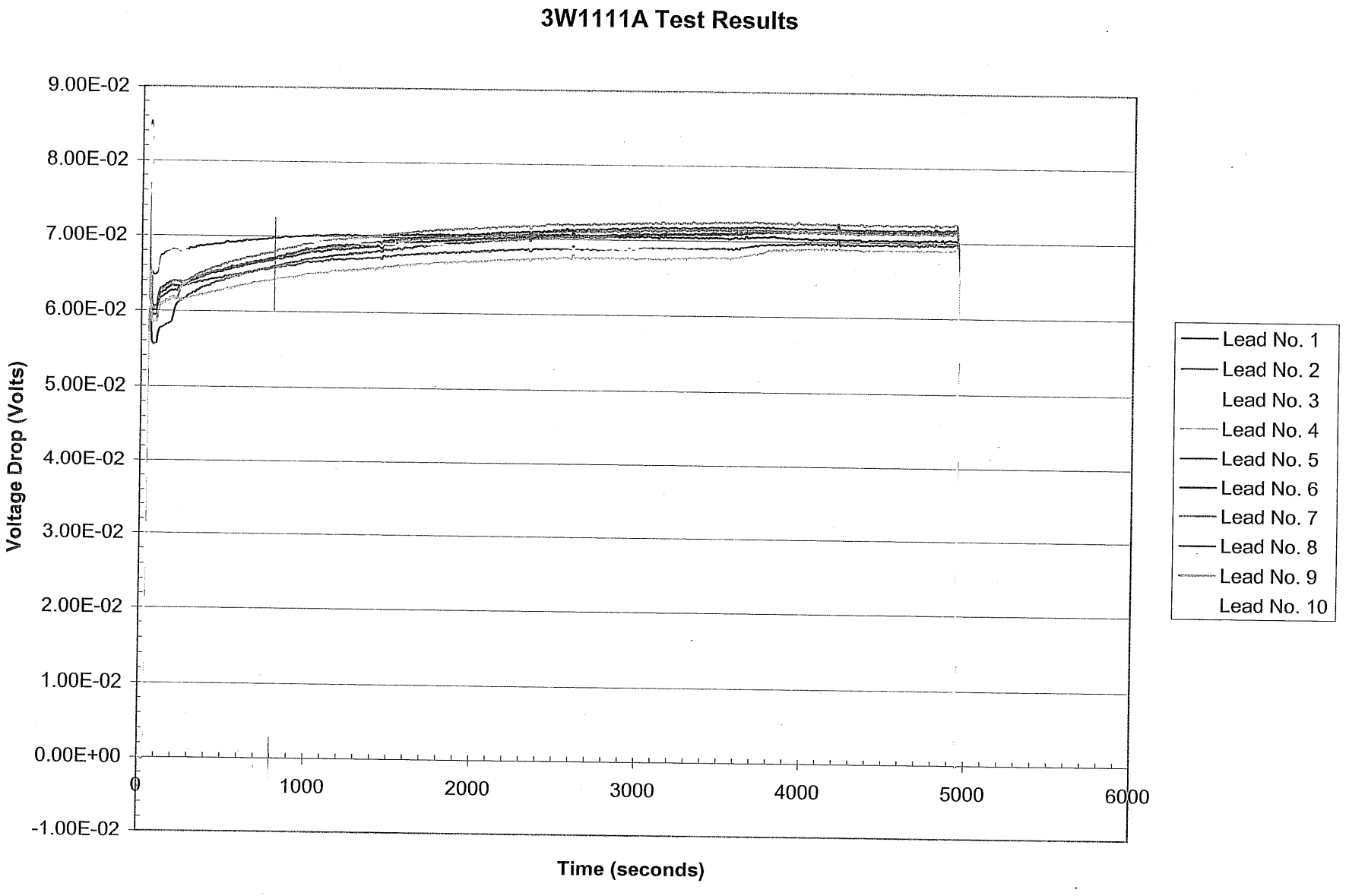

Current Lead Test Data Sheet

Current Lead Serial Number 3W1111B Dwg and Rev Number

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #1	4 57/64	4.89	11-18-03	JACK
Lead #2	4 7/8	4.88		
Lead #3	4 57/64			
Lead #4	4 57/64			
Lead #5	4 57/64			
Lead #6	4 57/64			
Lead				
Lead				
Lead				
Lead				

Dimension B

Lead #1	9 21/32	9.66	11-18-03	JACK
Lead #2	9 21/32			
Lead #3	9 21/32			
Lead #4	9 21/32			
Lead #5	9 41/64	9.64		
Lead #6	9 21/32			
Lead				
Lead				
Lead				
Lead				

Dimension C

Lead #1	39 1/8	39.12	11-18-03	JACK
Lead #2	39 7/64	39.11		
Lead #3	39 3/32	39.10		
Lead #4	39 1/8			
Lead #5	39 1/8			
Lead #6	39 1/8			
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1 30 9/32		11-18-03	JACK
	Lead #2 30 9/32			
	Lead #3 30 9/32			
	Lead #4 30 9/32			
	Lead #5 30 9/32			
	Lead #6 30 9/32			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #1 6		11-18-03	JACK
	Lead #2 6			
	Lead #3 6			
	Lead #4 6			
	Lead #5 6			
	Lead #6 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F 5 5/64		11-18-03	JACK
	Dimension G			
	Lead #1 0		11-18-03	JACK
	Lead #2 0			
	Lead #3 0			
	Lead #4 0			
	Lead #5 1/64			
	Lead #6 1/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H .002		11-18-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-14-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-17-03	RF
	Leak rate achieved?	4×10^{-10}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	11-17-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	12-1-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-1-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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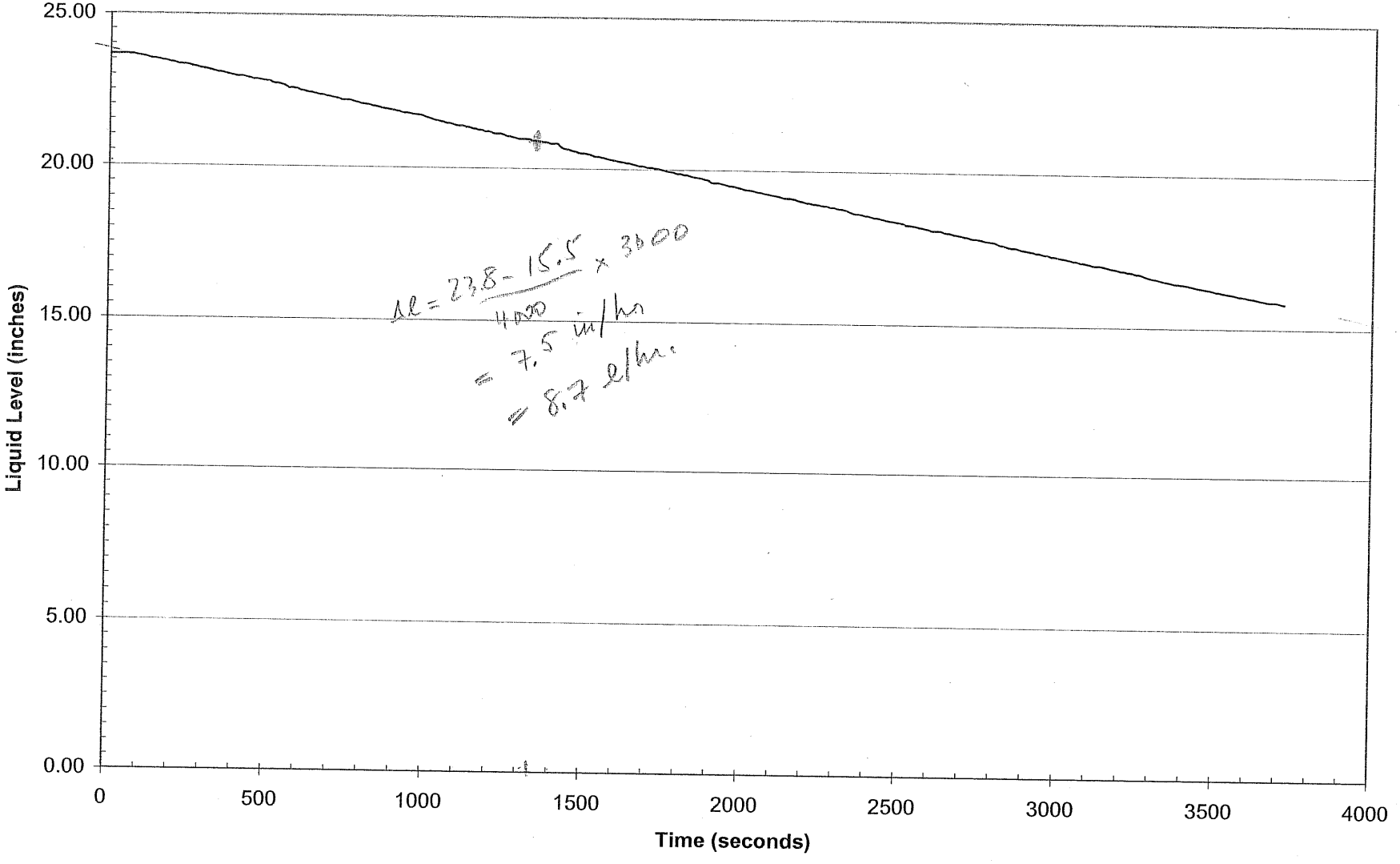
3W111B Helium Consumption



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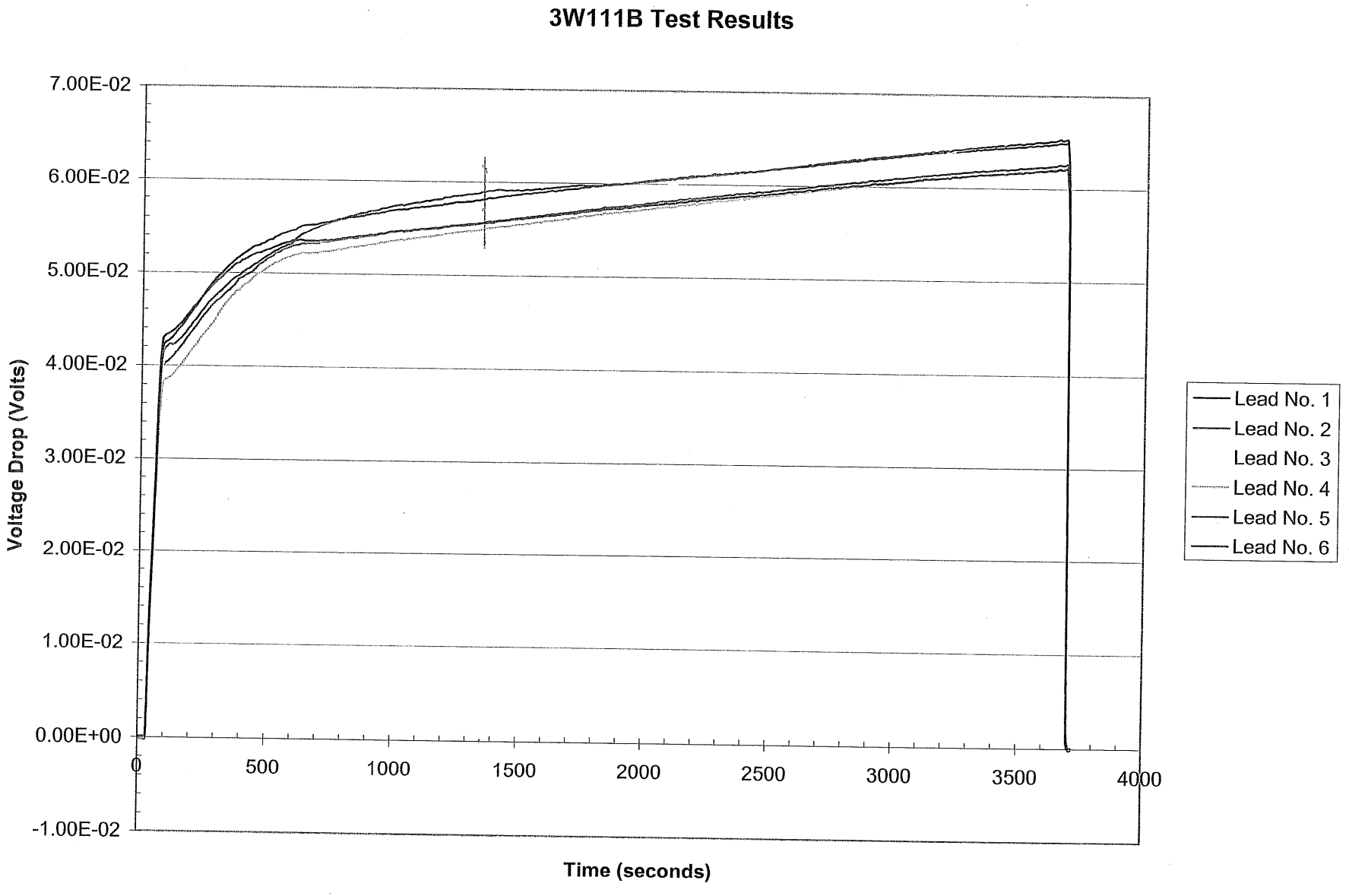

Current Lead Test Data Sheet

Current Lead Serial Number 3W1111C Dwg and Rev Number

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #7	4 57/64	4.89	11-18-03	JACK
Lead #8	4 57/64			
Lead #9	4 7/8	4.88		
Lead #10	4 57/64			
Lead #11	4 57/64			
Lead #12	4 57/64			
Lead				
Lead				
Lead				
Lead				

Dimension B

Lead #7	9 21/32	9.66	11-18-03	JACK
Lead #8	9 21/32			
Lead #9	9 21/32			
Lead #10	9 21/32			
Lead #11	9 21/32			
Lead #12	9 21/32			
Lead				
Lead				
Lead				
Lead				

Dimension C

Lead #7	39 1/8	39.12	11-18-03	JACK
Lead #8	39 1/8			
Lead #9	39 7/64	39.11		
Lead #10	39 1/8			
Lead #11	39 7/64			
Lead #12	39 1/8			
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #7	30 9/32	11-18-03	JACK
	Lead #8	30 9/32		
	Lead #9	30 9/32		
	Lead #10	30 9/32		
	Lead #11	30 9/32		
	Lead #12	30 9/32		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #7	6	11-18-03	JACK
	Lead #8	6		
	Lead #9	6		
	Lead #10	6		
	Lead #11	6		
	Lead #12	6		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F	5 1/16	11-18-03	JACK
	Dimension G			
	Lead #7	0	11-18-03	JACK
	Lead #8	1/64		
	Lead #9	1/64		
	Lead #10	1/64		
	Lead #11	0		
	Lead #12	1/64		
	Lead			
	Lead			
	Lead			
	Dimension H	0.002 (per email from AMI)	11-18-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-17-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-18-03	RF
	Leak rate achieved?	1.9×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	11-18-03	BM
	Isolation voltage achieved	2KV / 4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	12-3-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-3-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer 12/4/03

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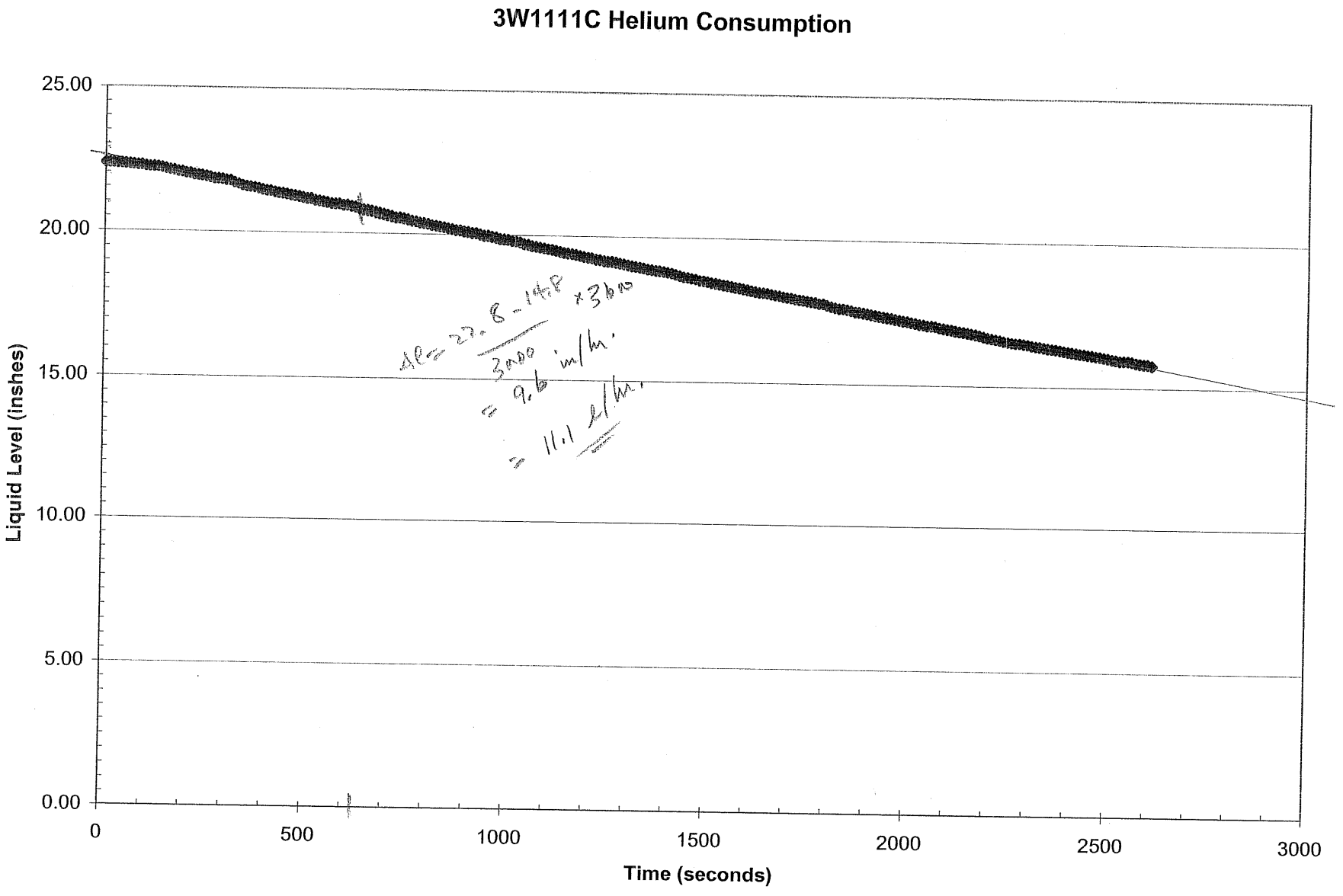

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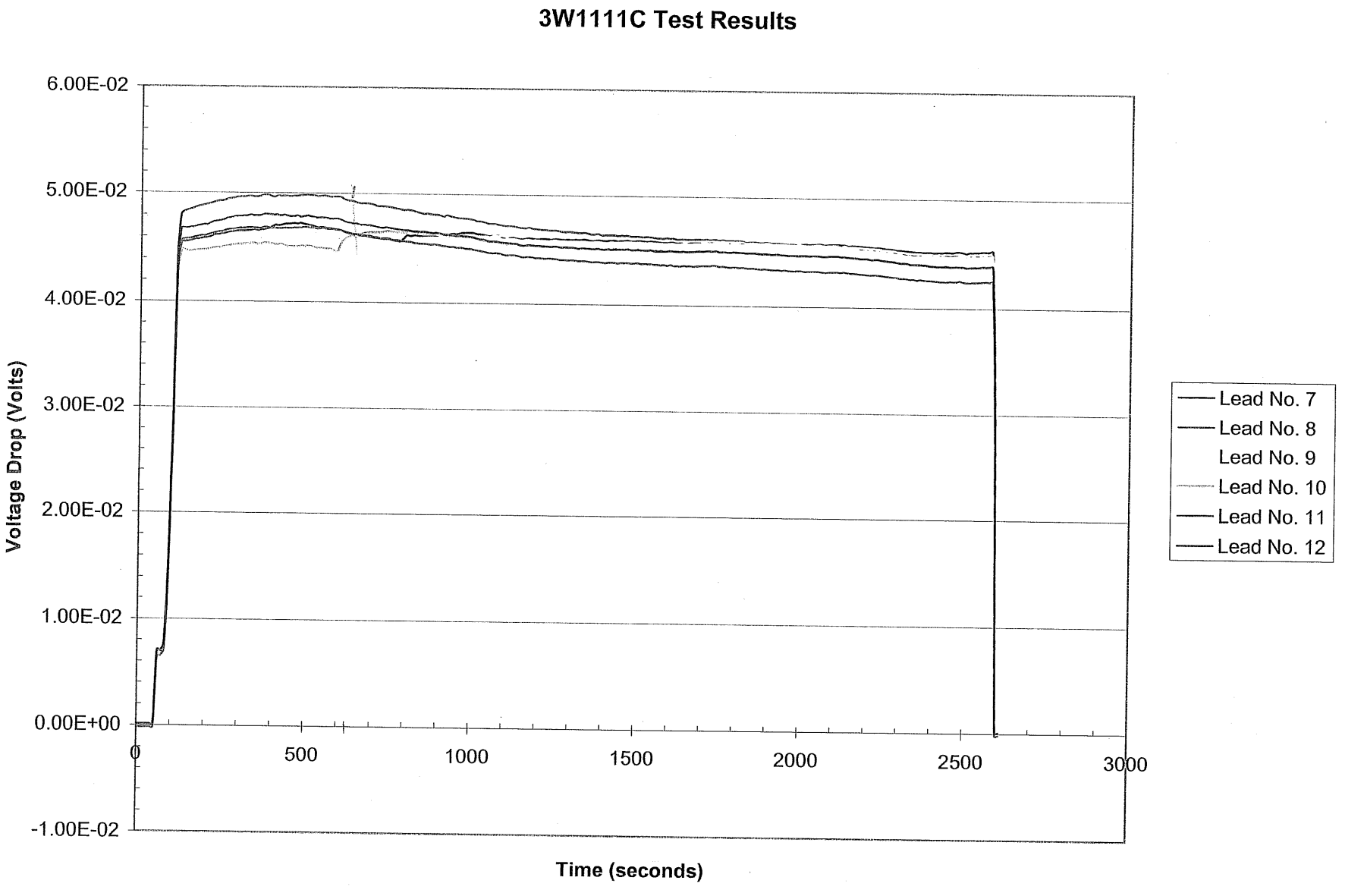

Current Lead Test Data Sheet

Current Lead Serial Number 3W 1111 D Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			
	Dimension A			
	Lead #13	4 29/32 4.91	11-18-03	JACK
	Lead #14	4 57/64 4.89		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension B			
	Lead #13	9 43/64 9.67	11-18-03	JACK
	Lead #14	9 21/32 9.66		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension C			
	Lead #13	39 7/64 39.11	11-18-03	JACK
	Lead #14	39 3/32 39.09		
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #13 30 9/32 30.28		11-18-03	JACK
	Lead #14 30 9/32			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #13 6		11-18-03	JACK
	Lead #14 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F		11-18-03	JACK
	Dimension G			
	Lead #13 1/64		11-18-03	JACK
	Lead #14 0			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H .005		11-18-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-12-03	TF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-13-03	RF
	Leak rate achieved?	1.1×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	11-13-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	12-3-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-3-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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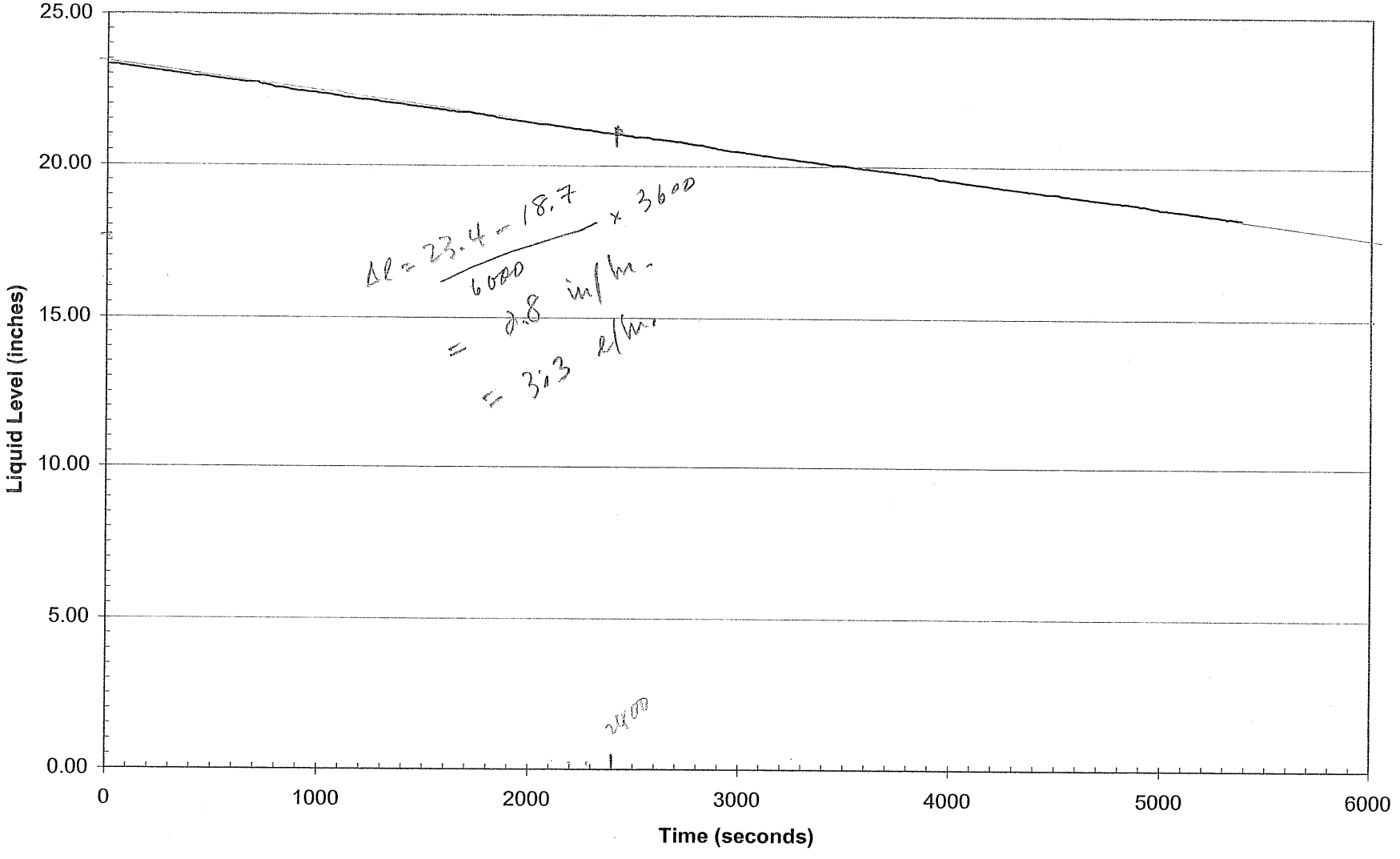
3W1111D Helium Consumption



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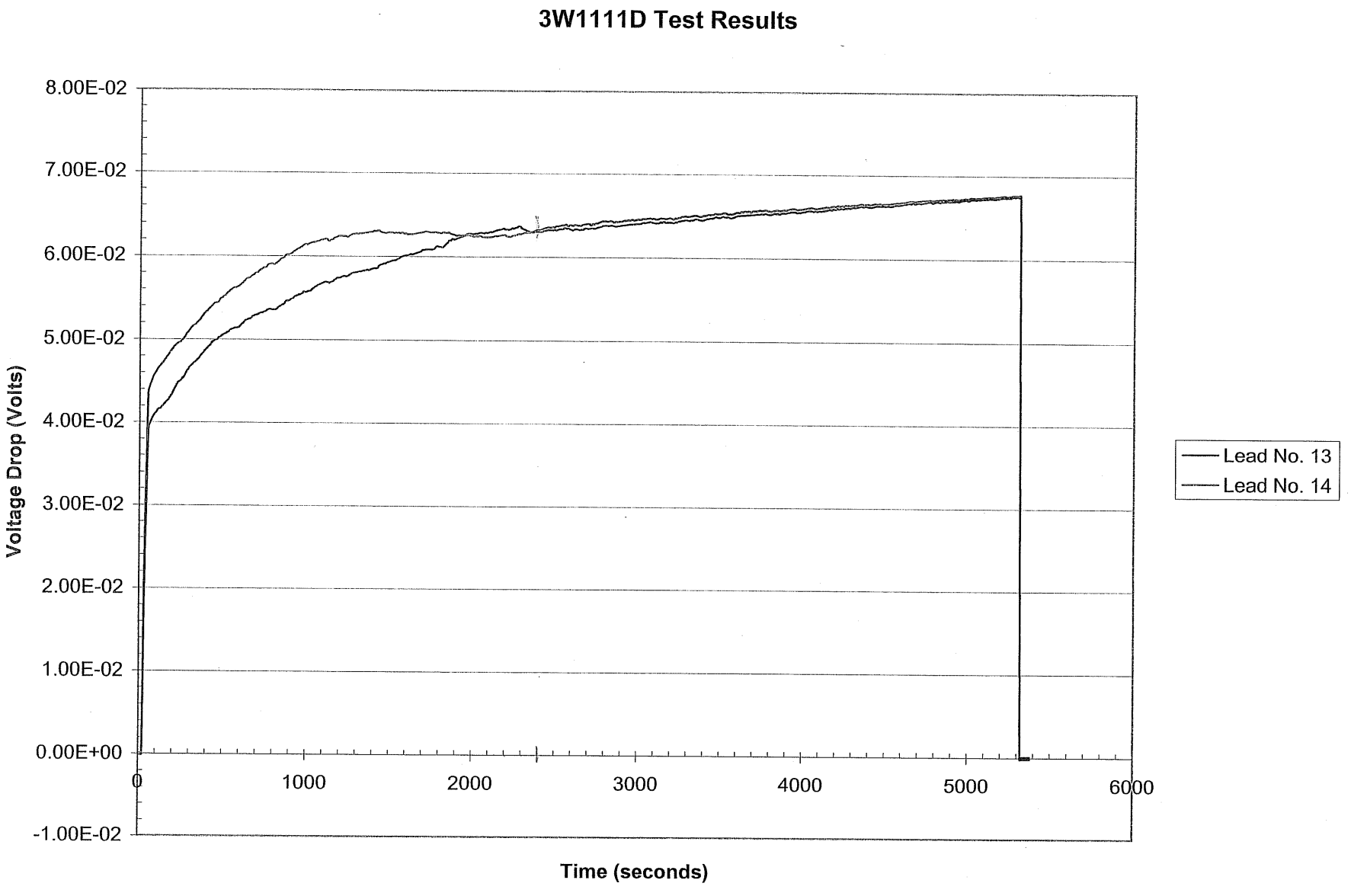

P.O. Box 2509
112 Flint Road
Oak Ridge, TN 37831-2509
Phone: (865) 482-1056 x46
Fax: (865) 482-5472
http://www.americanmagnetics.com

American Magnetics, Inc.

Fax

To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5310	**Pages:**	13
Phone:		**Date:**	12/12/03
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

● **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

3W1118A	120 Amp 5-lead pair cluster
3W1118B	600 Amp 3-lead pair cluster
3W1118C	600 Amp 3-lead pair cluster
3W1118D	600 Amp 1-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 3W1118A Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #1	5 23/32	5.72	11-25-03	JACK
Lead #2	5 11/16	5.69		
Lead #3	5 23/32			
Lead #4	5 23/32			
Lead #5	5 45/64			
Lead #6	5 11/16			
Lead #7	5 23/32			
Lead #8	5 23/32			
Lead #9	5 23/32			
Lead #10	5 23/32			

Dimension B

Lead #1	9 19/32	9.59	11-25-03	JACK
Lead #2	9 19/32			
Lead #3	9 39/64	9.61		
Lead #4	9 39/64			
Lead #5	9 19/32			
Lead #6	9 19/32			
Lead #7	9 39/64			
Lead #8	9 19/32			
Lead #9	9 19/32			
Lead #10	9 19/32			

Dimension C

Lead #1	39 1/4	39.25	11-25-03	JACK
Lead #2	39 15/64	39.23		
Lead #3	39 7/32	39.22		
Lead #4	39 3/16	39.19		
Lead #5	39 7/32			
Lead #6	39 15/64			
Lead #7	39 7/32			
Lead #8	39 7/32	39.27		
Lead #9	39 17/64			
Lead #10	39 17/64			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1	31 17/64 31.27	11-25-03	JACK
	Lead #2	31 17/64		
	Lead #3	31 17/64		
	Lead #4	31 17/64		
	Lead #5	31 17/64		
	Lead #6	31 1/4		
	Lead #7	31 17/64		
	Lead #8	31 17/64		
	Lead #9	31 17/64		
	Lead #10	31 17/64		
	Dimension E			
	Lead #1	6	11-25-03	JACK
	Lead #2	6		
	Lead #3	6		
	Lead #4	6		
	Lead #5	6		
	Lead #6	6		
	Lead #7	6		
	Lead #8	6		
	Lead #9	6		
	Lead #10			
	Dimension F	5.140	11-25-03	JACK
	Dimension G			
	Lead #1	0	11-25-03	JACK
	Lead #2	0		
	Lead #3	0		
	Lead #4	1/64		
	Lead #5	1/64		
	Lead #6	0		
	Lead #7	1/64		
	Lead #8	1/64		
	Lead #9	0		
	Lead #10	0		
	Dimension H	.002	11-25-03	JACK

PCL XL error
Subsystem: KERNEL
Error: IllegalStreamHeader
Operator: 0x0
Position: 0

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-18-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-19-03	RF
	Leak rate achieved?	1.6×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	11-19-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	12-9-03	GB
	Isolation voltage achieved	600 V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-9-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer [signature] 12/12/03

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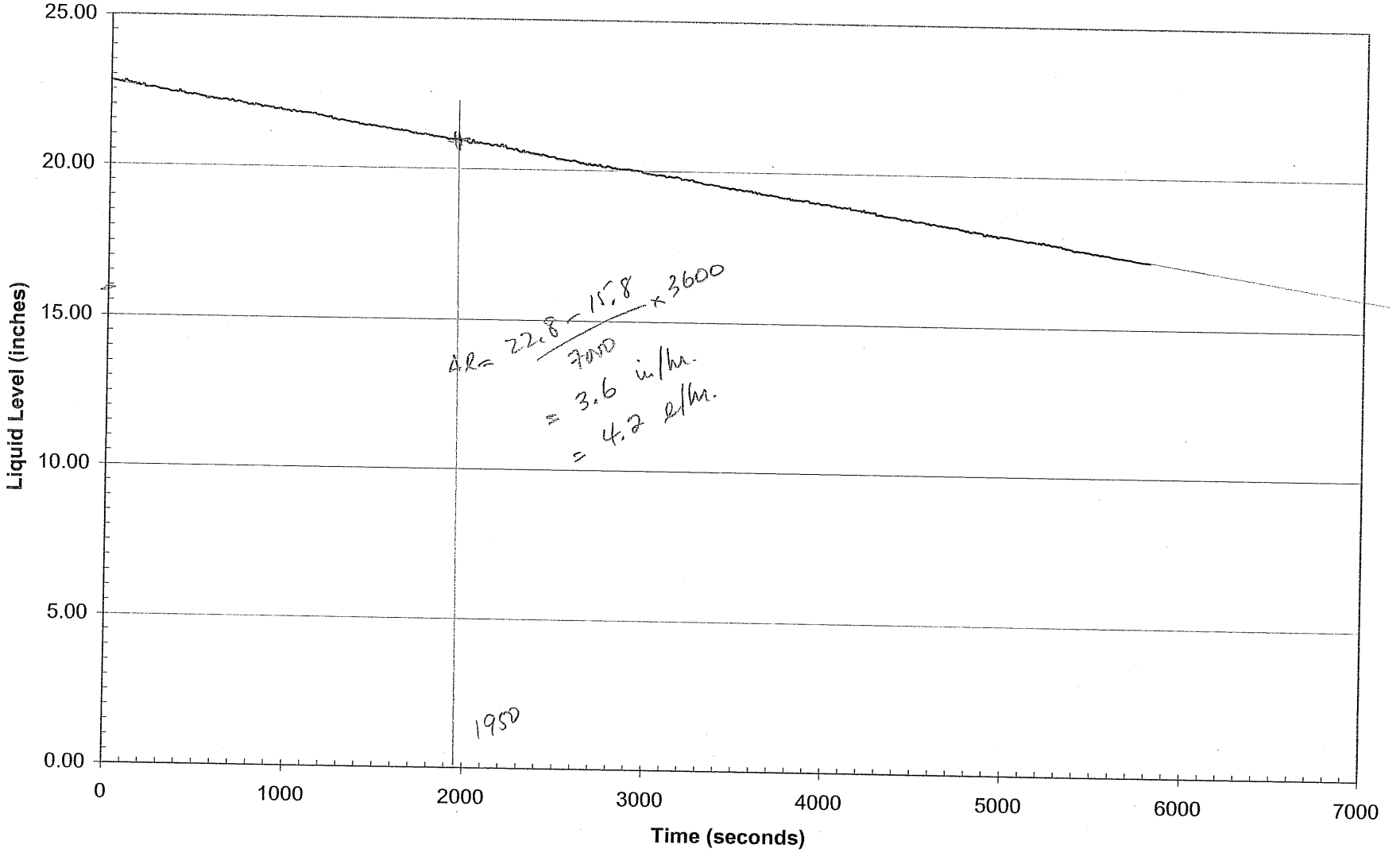
3W1118A Helium Consumption



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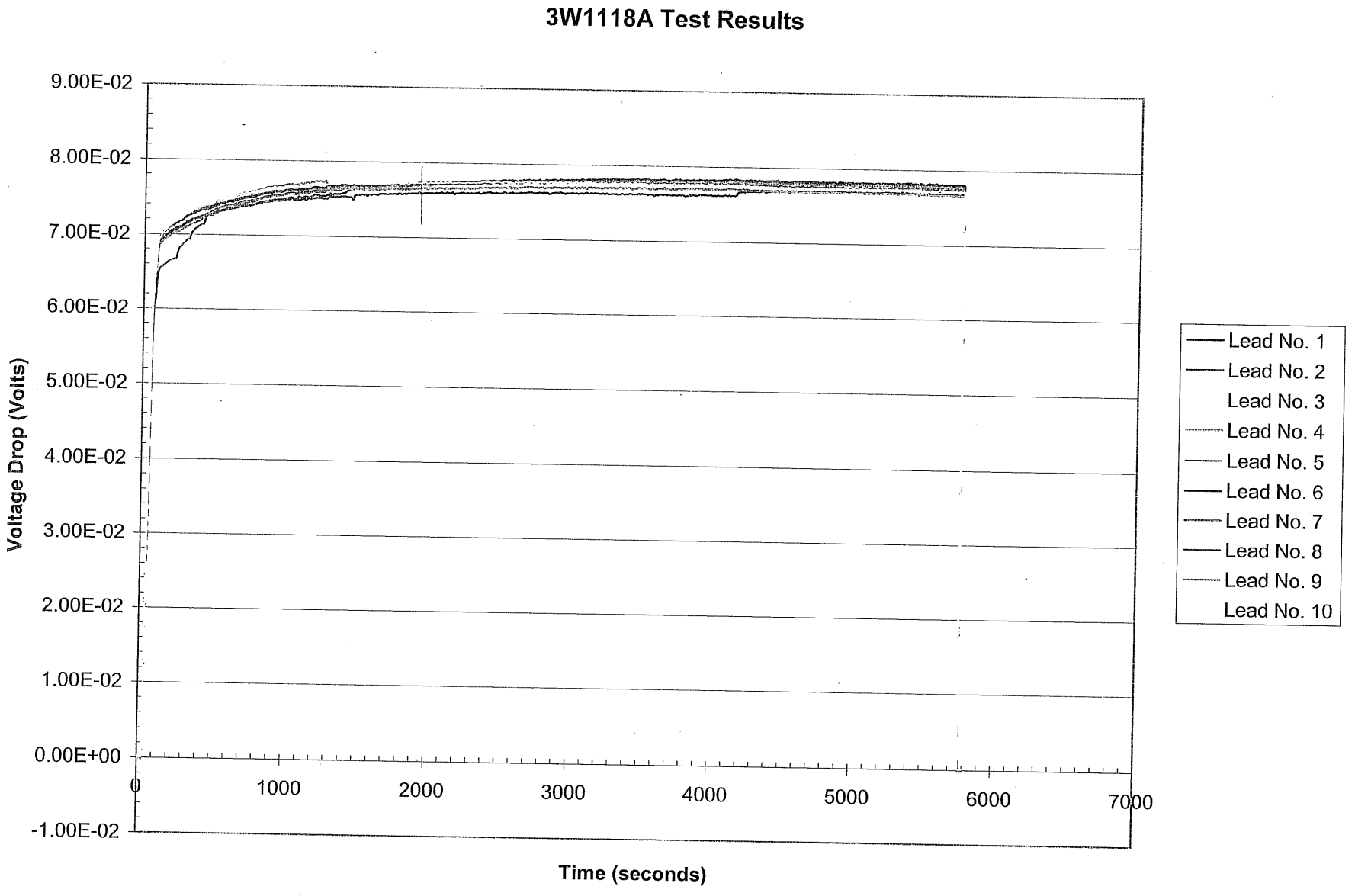

Current Lead Test Data Sheet

Current Lead Serial Number 3W1118 B Dwg and Rev Number

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A

Lead #1	4 57/64	4.89	11-25-03	JACK
Lead #2	4 57/64			
Lead #3	4 57/64			
Lead #4	4 57/64			
Lead #5	4 57/64			
Lead #6	4 57/64			
Lead				
Lead				
Lead				
Lead				

Dimension B

Lead #1	9 21/32	9.66	11-25-03	JACK
Lead #2	9 21/32			
Lead #3	9 21/32			
Lead #4	9 21/32			
Lead #5	9 21/32			
Lead #6	9 21/32			
Lead				
Lead				
Lead				
Lead				

Dimension C

Lead #1	39 1/8	39.12	11-25-03	JACK
Lead #2	39 9/64	39.14		
Lead #3	39 9/64			
Lead #4	39 5/32	39.16		
Lead #5	39 9/64	39.11		
Lead #6	39 3/32	39.09		
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1	30 9/32 30.28	11-25-03	JACK
	Lead #2	30 9/32		
	Lead #3	30 19/64 30.30		
	Lead #4	30 9/32		
	Lead #5	30 9/32		
	Lead #6	30 19/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #1	6	11-25-03	JACK
	Lead #2	6		
	Lead #3	6		
	Lead #4	6		
	Lead #5	6		
	Lead #6	6		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F	5.085	11-25-03	JACK
	Dimension G			
	Lead #1	1/64	11-25-03	JACK
	Lead #2	1/64		
	Lead #3	0		
	Lead #4	1/64		
	Lead #5	0		
	Lead #6	0		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.005	11-25-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-21-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-24-03	RF
	Leak rate achieved?	2.4×10^{-10}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	11-24-03	BM
	Isolation voltage achieved	2KV/415V		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	12-4-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-4-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer 12/12/03

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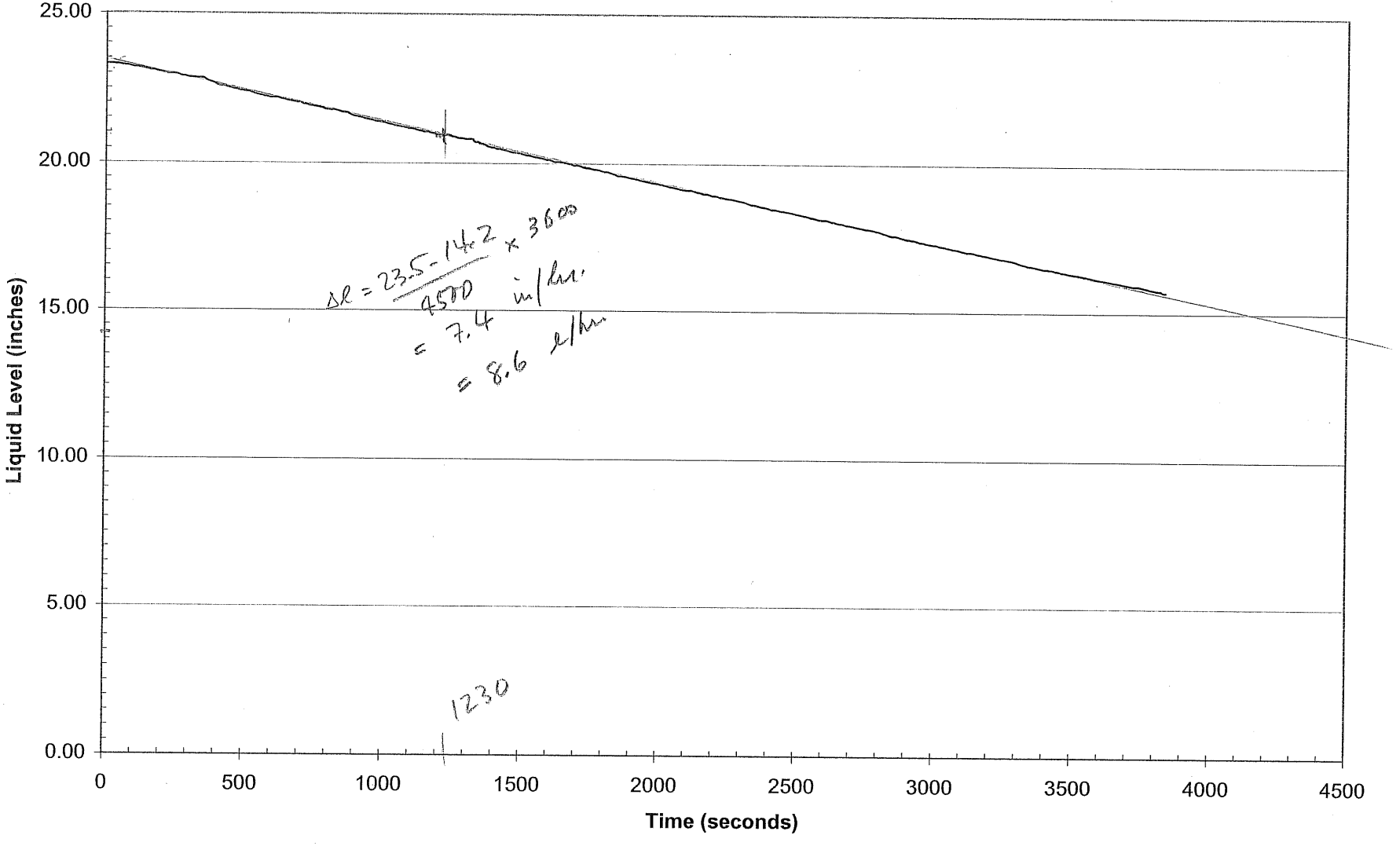
3W1118B Helium Consumption



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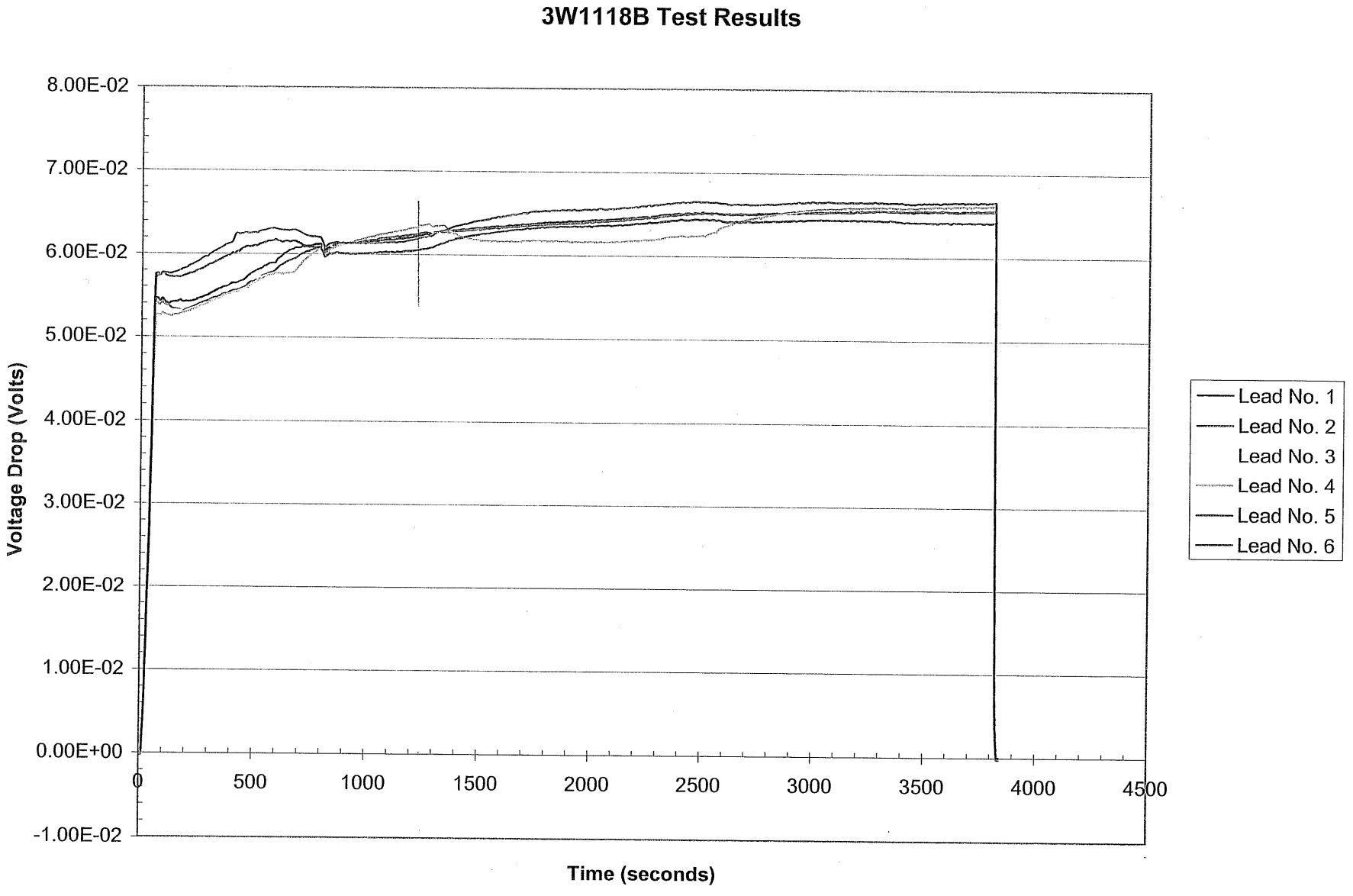

Current Lead Test Data Sheet

Current Lead Serial Number 3W1118C Dwg and Rev Number

Test #	Test Title			Date	Technician
1	Dimensional Check				
	Dimension A				
	Lead # 7	4 7/8	4.88	11-25-03	JACK
	Lead # 8	4 57/64	4.89		
	Lead # 9	4 57/64			
	Lead # 10	4 29/32	4.90		
	Lead # 11	4 57/64			
	Lead # 12	4 57/64			
	Lead				
	Lead				
	Lead				
	Lead				
	Dimension B				
	Lead # 7	9 21/32	9.66	11-25-03	JACK
	Lead # 8	9 43/64	9.67		
	Lead # 9	9 21/32			
	Lead # 10	9 43/64			
	Lead # 11	9 21/32			
	Lead # 12	9 43/64			
	Lead				
	Lead				
	Lead				
	Lead				
	Dimension C				
	Lead # 7	39 1/8	39.12	11-25-03	JACK
	Lead # 8	39 9/64	39.14		
	Lead # 9	39 1/8			
	Lead # 10	39 7/64			
	Lead # 11	39 9/64			
	Lead # 12	39 9/64			
	Lead				
	Lead				
	Lead				
	Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead # 7	30 9/32 30.28	11-25-03	JACK
	Lead # 8	30 19/64 30.30		
	Lead # 9	30 9/32		
	Lead # 10	30 9/32		
	Lead # 11	30 9/32		
	Lead # 12	30 9/32		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead # 7	6	11-25-03	JACK
	Lead # 8	6		
	Lead # 9	6		
	Lead # 10	6		
	Lead # 11	6		
	Lead # 12	6		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F	5.069	11-25-03	JACK
	Dimension G			
	Lead # 7	1/64	11-25-03	JACK
	Lead # 8	0		
	Lead # 9	0		
	Lead # 10	1/64		
	Lead # 11	0		
	Lead # 12	1/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.002	11-25-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-24-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-25-03	RF
	Leak rate achieved?	1.2×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	11-25-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	12-8-03	GB
	Isolation voltage achieved	600		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12/12/03	GJ
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer [signature] 12/12/03

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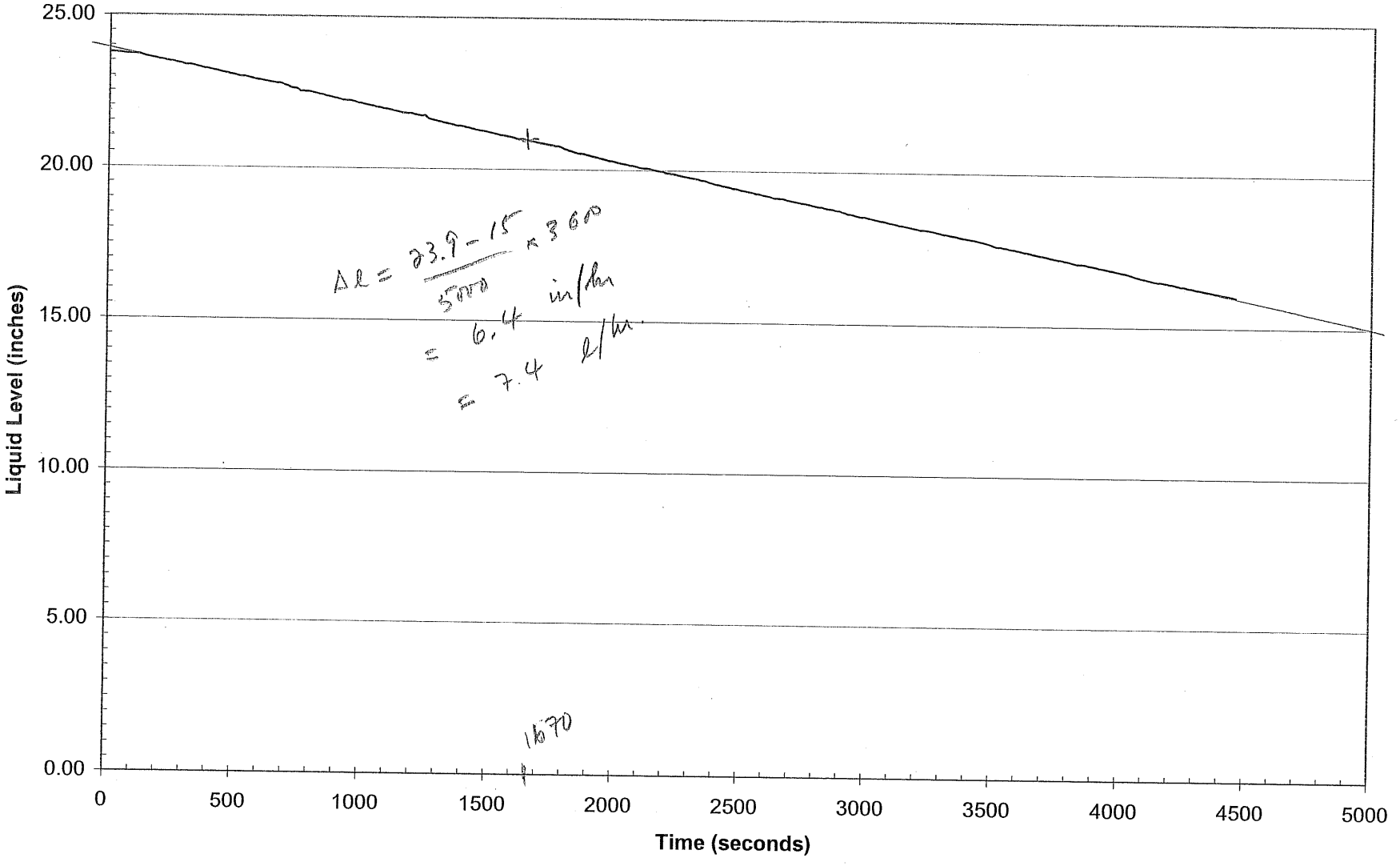
3W1118C Helium Consumption



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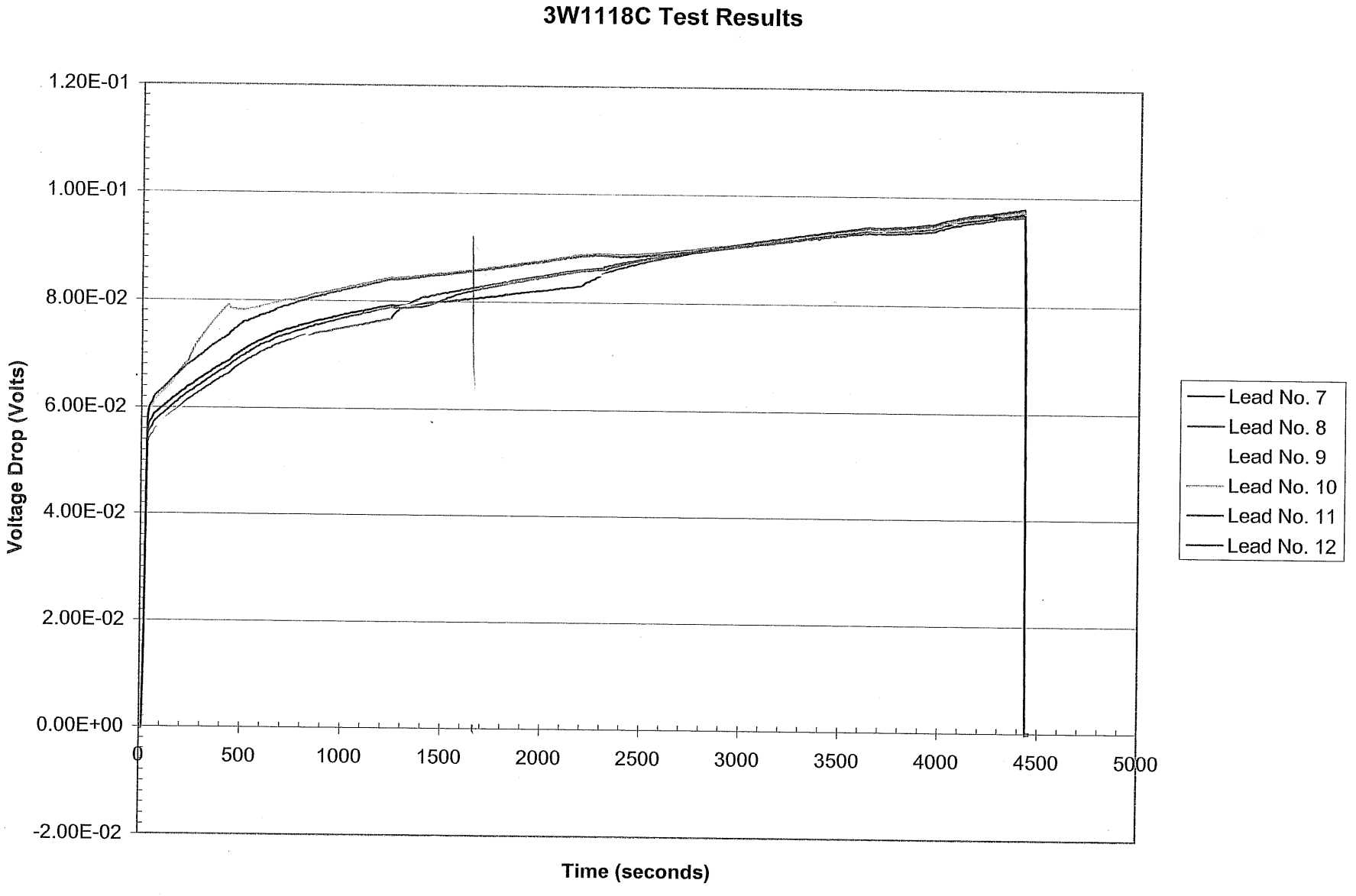

Current Lead Test Data Sheet

Current Lead Serial Number 3W1118 D Dwg and Rev Number _____

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A

Lead #13	4 57/64	4.89	11-25-03	JACK
Lead #14	4 57/64			
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

Dimension B

Lead #13	9 21/32	9.66	11-25-03	JACK
Lead #14	9 21/32			
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

Dimension C

Lead #13	39 9/64	39.14	11-25-03	JACK
Lead #14	39 9/64			
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #13 30 9/32 30.28		11-25-03	JACK
	Lead #14 30 19/64 30.30			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #13 6		11-25-03	JACK
	Lead #14 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F		11-25-03	JACK
	Dimension G			
	Lead #13 0		11-25-03	JACK
	Lead #14 0			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.005	11-25-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-19-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-20-03	RF
	Leak rate achieved?	1.7×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	11-20-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	12-8-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-8-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer 12/12/03

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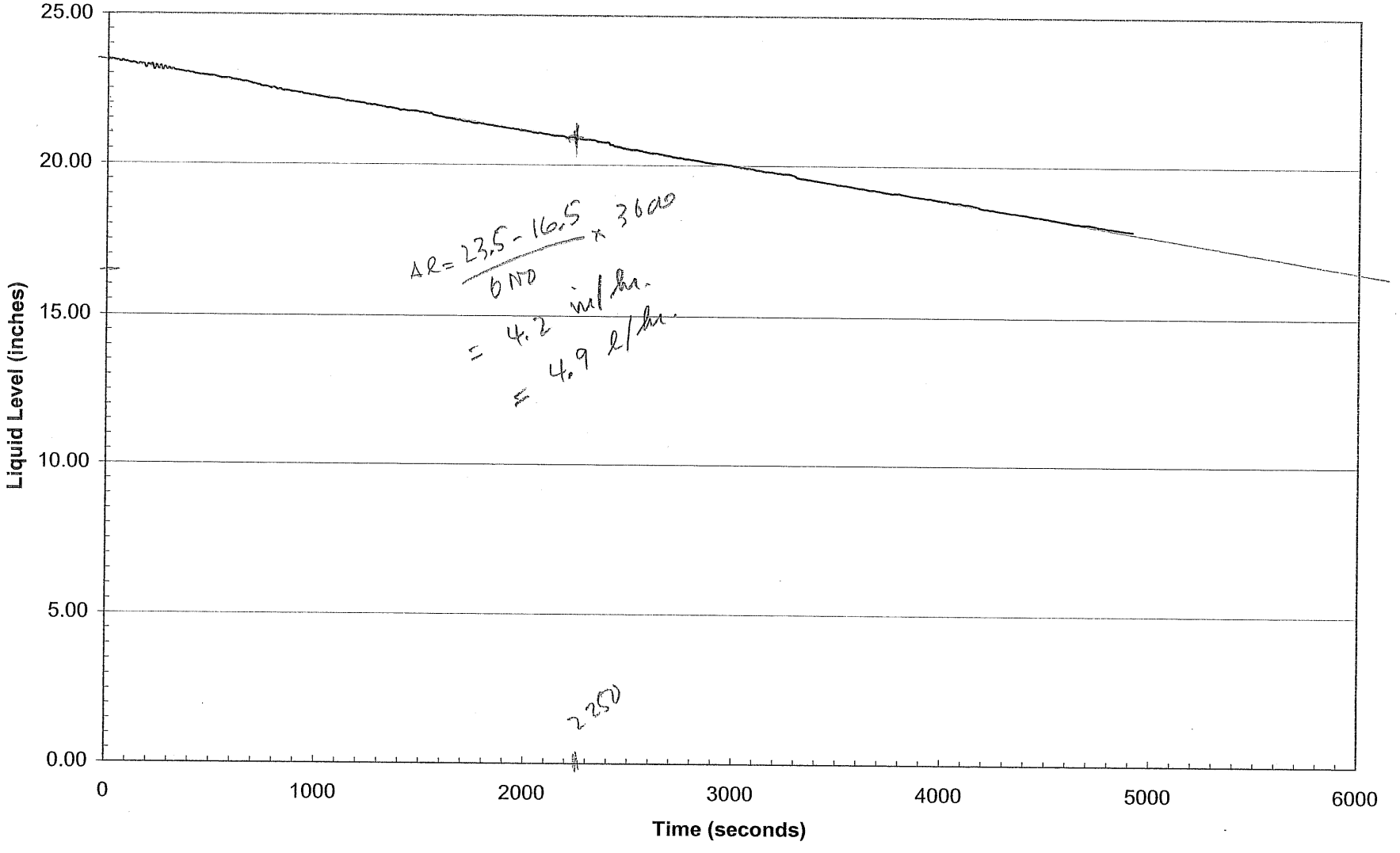
3W1118D Helium Consumption



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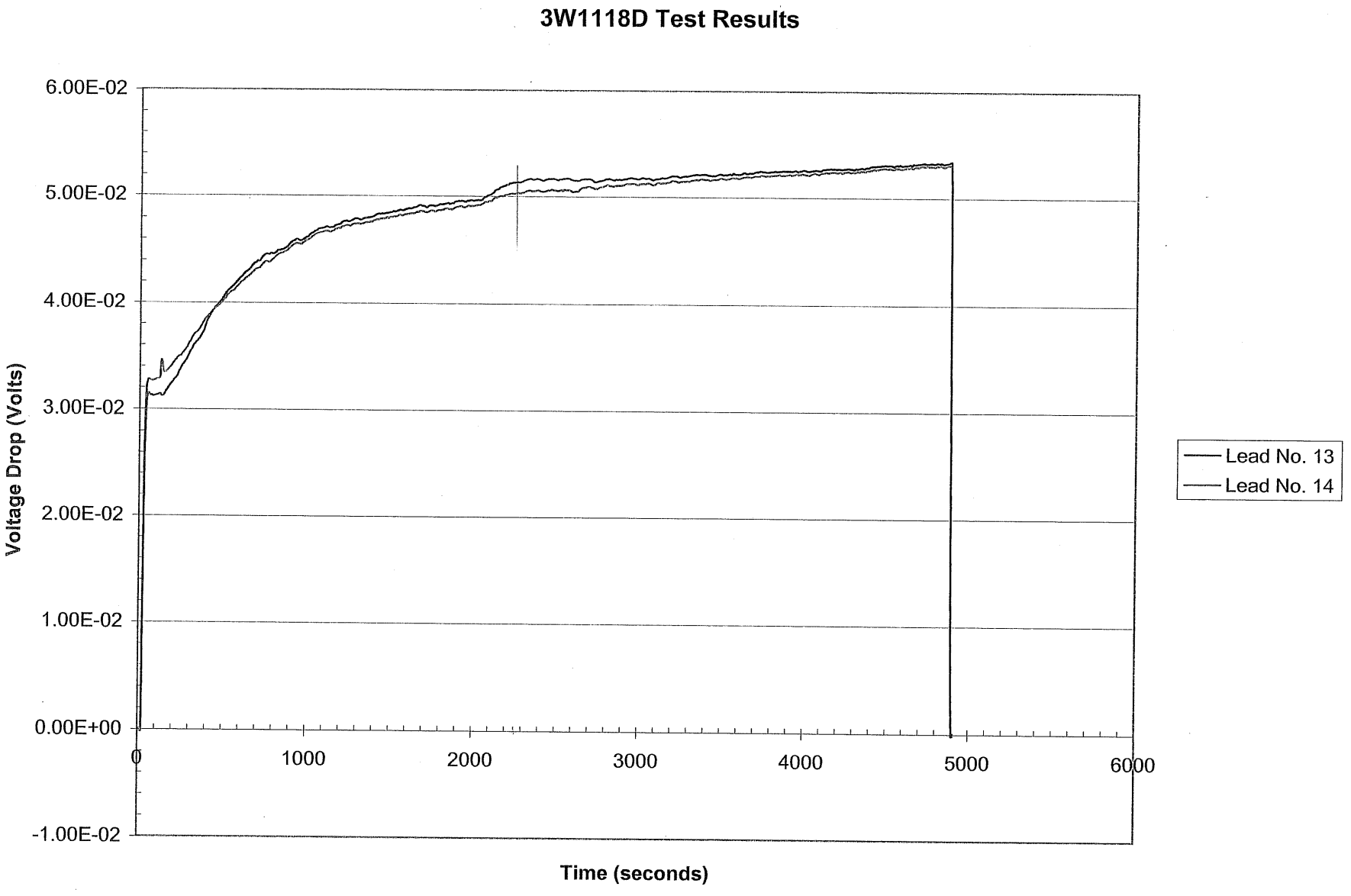

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Oak Ridge, TN 37831-2509
Phone: (865) 482-1056 x46
Fax: (865) 482-5472
http://www.americanmagnetics.com

American Magnetics, Inc.

Fax

To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5310	**Pages:**	10
Phone:		**Date:**	12/18/03
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

3W1125A 120 Amp 5-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 3W 1125A Dwg and Rev Number _____

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A ✓

Lead #1	5 47/64	5.73	12-3-03	JACK
Lead #2	5 47/64			
Lead #3	5 23/32	5.72		
Lead #4	5 23/32			
Lead #5	5 45/64	5.70		
Lead #6	5 23/32			
Lead #7	5 23/32			
Lead #8	5 45/64			
Lead #9	5 23/32			
Lead #10	5 23/32			

Dimension B ✓

Lead #1	9 5/8	9.63	12-3-03	JACK
Lead #2	9 5/8			
Lead #3	9 5/8			
Lead #4	9 5/8			
Lead #5	9 39/64	9.61		
Lead #6	9 5/8			
Lead #7	9 5/8			
Lead #8	9 5/8			
Lead #9	9 5/8			
Lead #10	9 5/8			

Dimension C ✓

Lead #1	39 3/16	39.19	12-3-03	JACK
Lead #2	39 3/16			
Lead #3	39 13/64	39.20		
Lead #4	39 3/16			
Lead #5	39 13/64			
Lead #6	39 13/64			
Lead #7	39 13/64			
Lead #8	39 13/64			
Lead #9	39 13/64			
Lead #10	39 3/16			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1	31 17/64 31.27	12-3-03	JACK
	Lead #2	31 17/64		
	Lead #3	31 17/64		
	Lead #4	31 1/4 31.25		
	Lead #5	31 17/64		
	Lead #6	31 17/64		
	Lead #7	31 17/64		
	Lead #8	31 17/64		
	Lead #9	31 17/64		
	Lead #10	31 17/64		
	Dimension E			
	Lead #1	6	12-3-03	JACK
	Lead #2	6		
	Lead #3	6		
	Lead #4	6		
	Lead #5	6		
	Lead #6	6		
	Lead #7	6		
	Lead #8	6		
	Lead #9	6		
	Lead #10	6		
	Dimension F	5.135	12-3-03	JACK
	Dimension G			
	Lead #1	1/64	12-3-03	JACK
	Lead #2	0		
	Lead #3	1/64		
	Lead #4	1/64		
	Lead #5	0		
	Lead #6	1/64		
	Lead #7	0		
	Lead #8	1/64		
	Lead #9	1/64		
	Lead #10	1/64		
	Dimension H	.007	12-3-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	12-2-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	12-3-03	RF
	Leak rate achieved?	2.8×10^{-10}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	12-3-03	SB
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	12-18-03	GB
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-18-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer [signature] 12/19/03

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http://www.americanmagnetics.com

American Magnetics, Inc.

Fax

To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5910	**Pages:**	10
Phone:		**Date:**	12/16/03
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

3W1125B	600 Amp 3-lead pair cluster
3W1125C	600 Amp 3-lead pair cluster
3W1125D	600 Amp 1-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 3W 1125 [redacted]

Dwg and Rev Number _____

Test #	Test Title		Date	Technician
1	Dimensional Check			
	Dimension A			
	Lead #1	4 57/64 4.89	12-3-03	JACK
	Lead #2	4 57/64		
	Lead #3	4 7/8 4.87		
	Lead #4	4 7/8		
	Lead #5	4 57/64		
	Lead #6	4 5[redacted]		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension B			
	Lead #1	9 21/[redacted] 9.66	12-3-03	JACK
	Lead #2	9 41/64 9.64		
	Lead #3	9 41/64		
	Lead #4	9 41/64		
	Lead #5	9 21/32		
	Lead #6	9 21/32		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension C			
	Lead #1	39 7/64 39.11	12-3-03	JACK
	Lead #2	39 9/64 39.14		
	Lead #3	39 7/64		
	Lead #4	39 9/64		
	Lead #5	39 9/64		
	Lead #6	39 9/64		
	Lead			
	Lead			
	Lead			
	Lead			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1	30 9/32 30.28	12-3-03	JACK
	Lead #2	30 9/32		
	Lead #3	30 9/32		
	Lead #4	30 19/64		
	Lead #5	30 9/32		
	Lead #6	30 9/32		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #1	6	12-3-03	JACK
	Lead #2	6		
	Lead #3	6		
	Lead #4	6		
	Lead #5	6		
	Lead #6	6		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F	5.085	12-3-03	JACK
	Dimension G			
	Lead #1	1/64	12-3-03	JACK
	Lead #2	1/64		
	Lead #3	0		
	Lead #4	0		
	Lead #5	1/64		
	Lead #6	1/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.006	12-3-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-25-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	11-26-03	RF
	Leak rate achieved?	1.1×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	11-26-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	12-12-03	GB (GL)
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-12-03	GB (GL)
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

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Current Lead Test Data Sheet

Current Lead Serial Number 3W 1125C Dwg and Rev Number _____

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A ✓

Lead #7	4 57/64	4.89	12-3-03	JD
Lead #8	4 7/8	4.88		
Lead #9	4 7/8			
Lead #10	4 57/64			
Lead #11	4 57/64			
Lead #12	4 59/64	4.98		
Lead				
Lead				
Lead				
Lead				

Dimension B ✓

Lead #7	9 21/32	9.66	12-3-03	JD
Lead #8	9 21/32			
Lead #9	9 41/64	9.64		
Lead #10	9 21/32			
Lead #11	9 21/32			
Lead #12	9 21/32			
Lead				
Lead				
Lead				
Lead				

Dimension C ✓

Lead #7	39 1/8	39.13	12-3-03	JD
Lead #8	39 1/8			
Lead #9	39 9/64	39.14		
Lead #10	39 9/64			
Lead #11	39 1/8			
Lead #12	39 7/64	39.11		
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #7	30 9/32	12-3-03	JD
	Lead #8	30 19/64		
	Lead #9	30 19/64		
	Lead #10	30 9/32		
	Lead #11	30 9/32		
	Lead #12	30 9/32		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #7	6	12-3-03	JD
	Lead #8	6		
	Lead #9	6		
	Lead #10	6		
	Lead #11	6		
	Lead #12			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F	5.065	12-3-03	JD
	Dimension G			
	Lead #7	0	12-3-03	JD
	Lead #8	1/64		
	Lead #9	1/64		
	Lead #10	0		
	Lead #11	1/64		
	Lead #12	1/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.002	12-3-03	JD

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	11-26-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	12-1-03	RF
	Leak rate achieved?	3.8×10^{-10}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	12-1-03	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	12-15-03	GB
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-15-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer [signature] 12/16/03

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Current Lead Test Data Sheet

Current Lead Serial Number 3W1125D Dwg and Rev Number _____

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A

Lead _____ 12-3-03 JACK
Lead #13 4 57/64 4.89
Lead #14 4 57/64
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____

Dimension B

9.66

Lead _____ 12-3-03 JACK
Lead #13 9 21/32
Lead #14 9 21/32
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____

Dimension C

Lead _____ 12-3-03 JACK
Lead #13 39 7/64
Lead #14 39 9/64
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____
Lead _____

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead		12-3-03	JACK
	Lead #13 30 9/32 30.28			
	Lead #14 30 9/32			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead		12-3-03	JACK
	Lead #13 6			
	Lead #14 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F		12-3-03	JACK
	Dimension G			
	Lead		12-3-03	JACK
	Lead #13 0			
	Lead #14 1/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.005	12-3-03	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	12-1-03	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	12-2-03	RF
	Leak rate achieved?	4.2×10^{-10}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	12-2-03	SB
	Isolation voltage achieved	2KV / 4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	12-16-03	GB
	Isolation voltage achieved	600 V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	12-16-03	GB
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer [signature] 12/16/03

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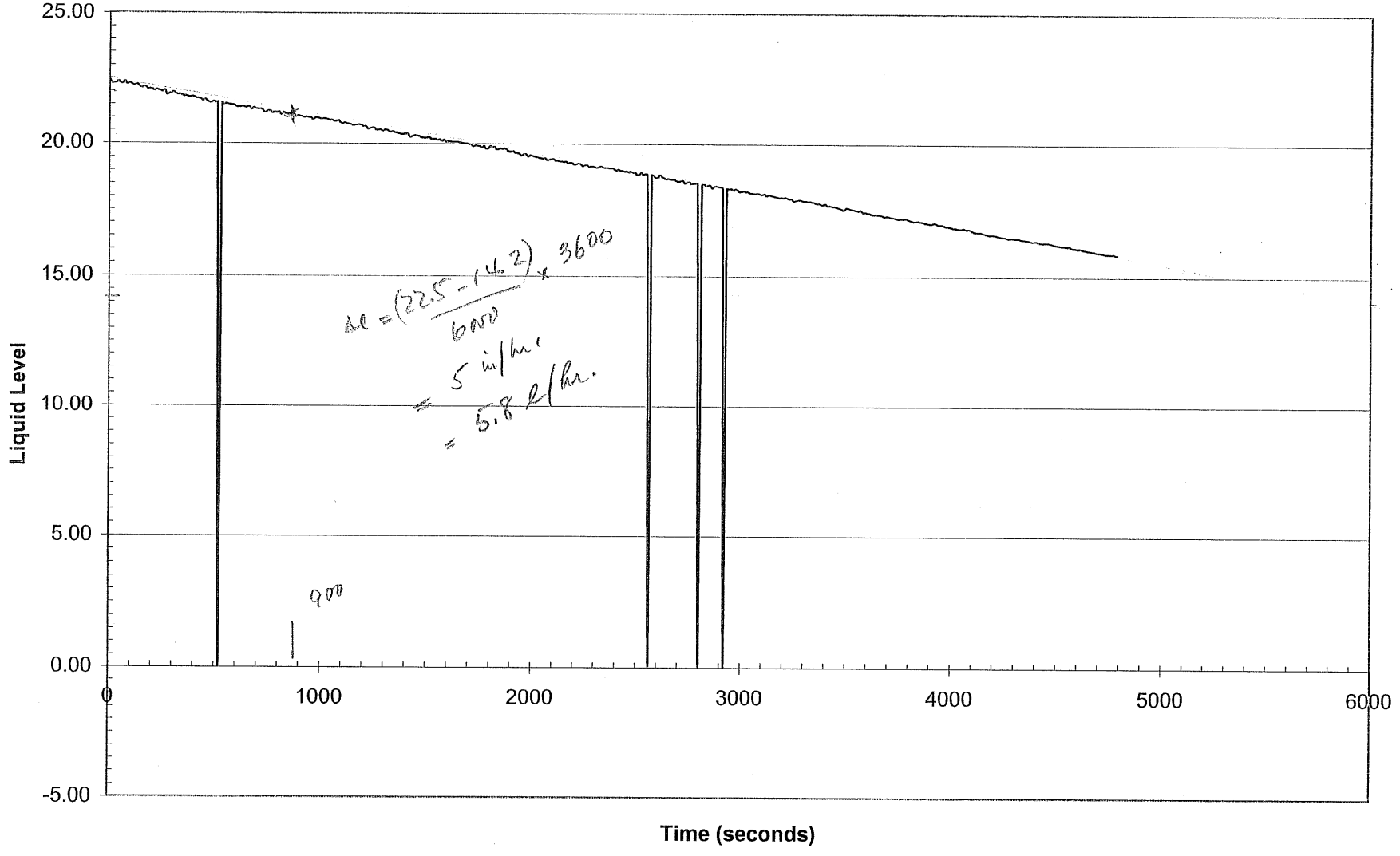
3W1125A Helium Consumption



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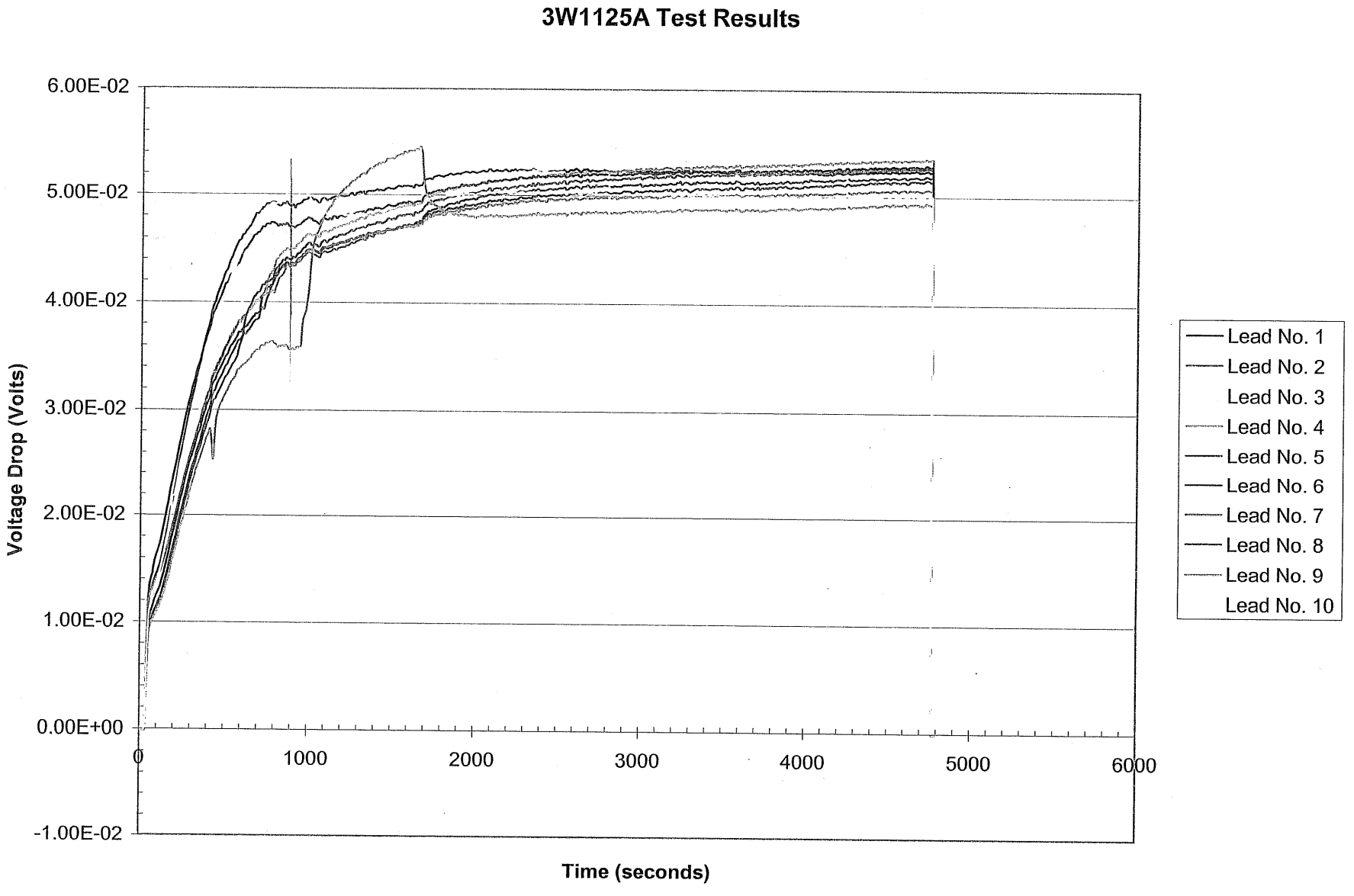

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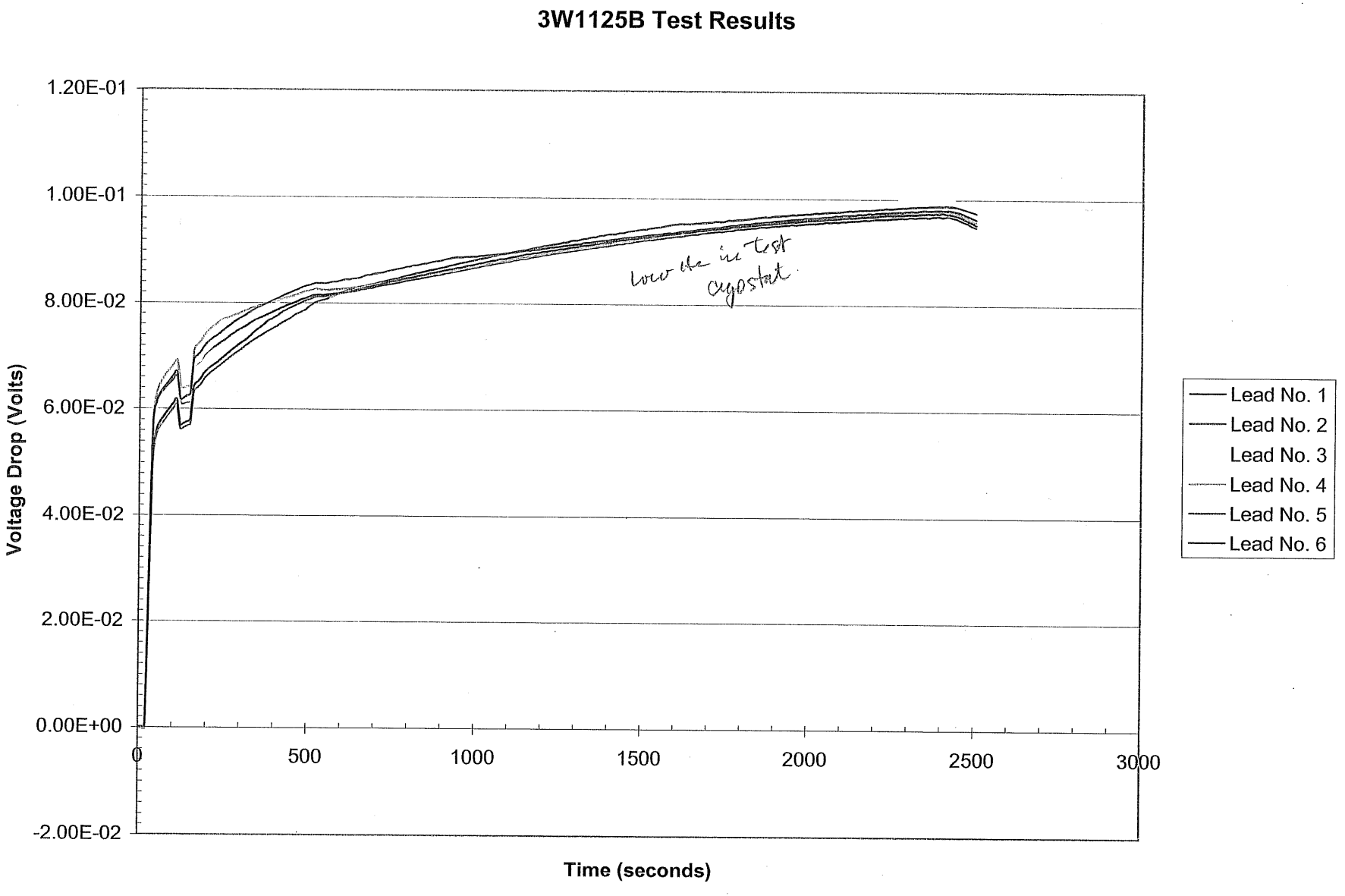

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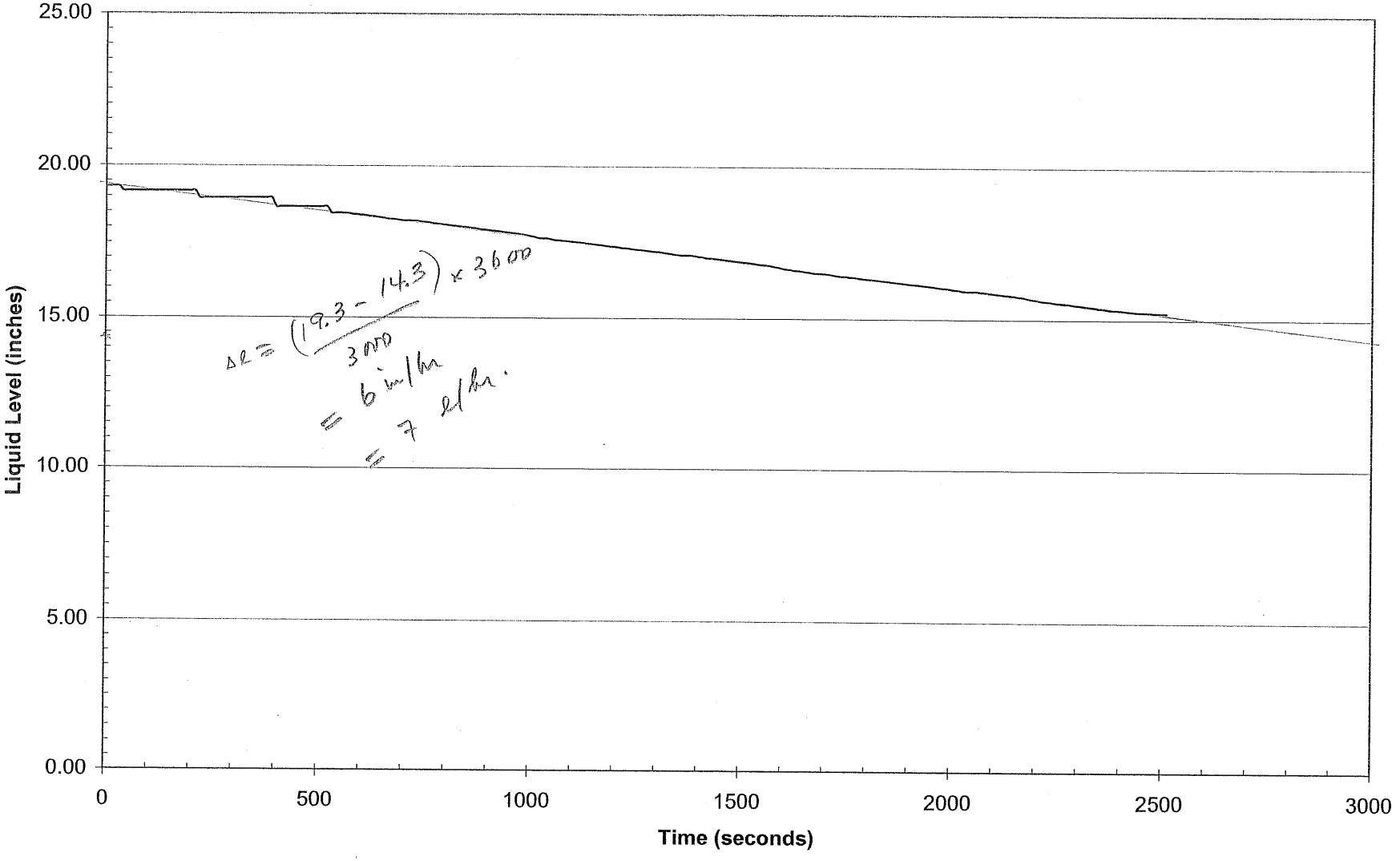
3W1125B Helium Consumption



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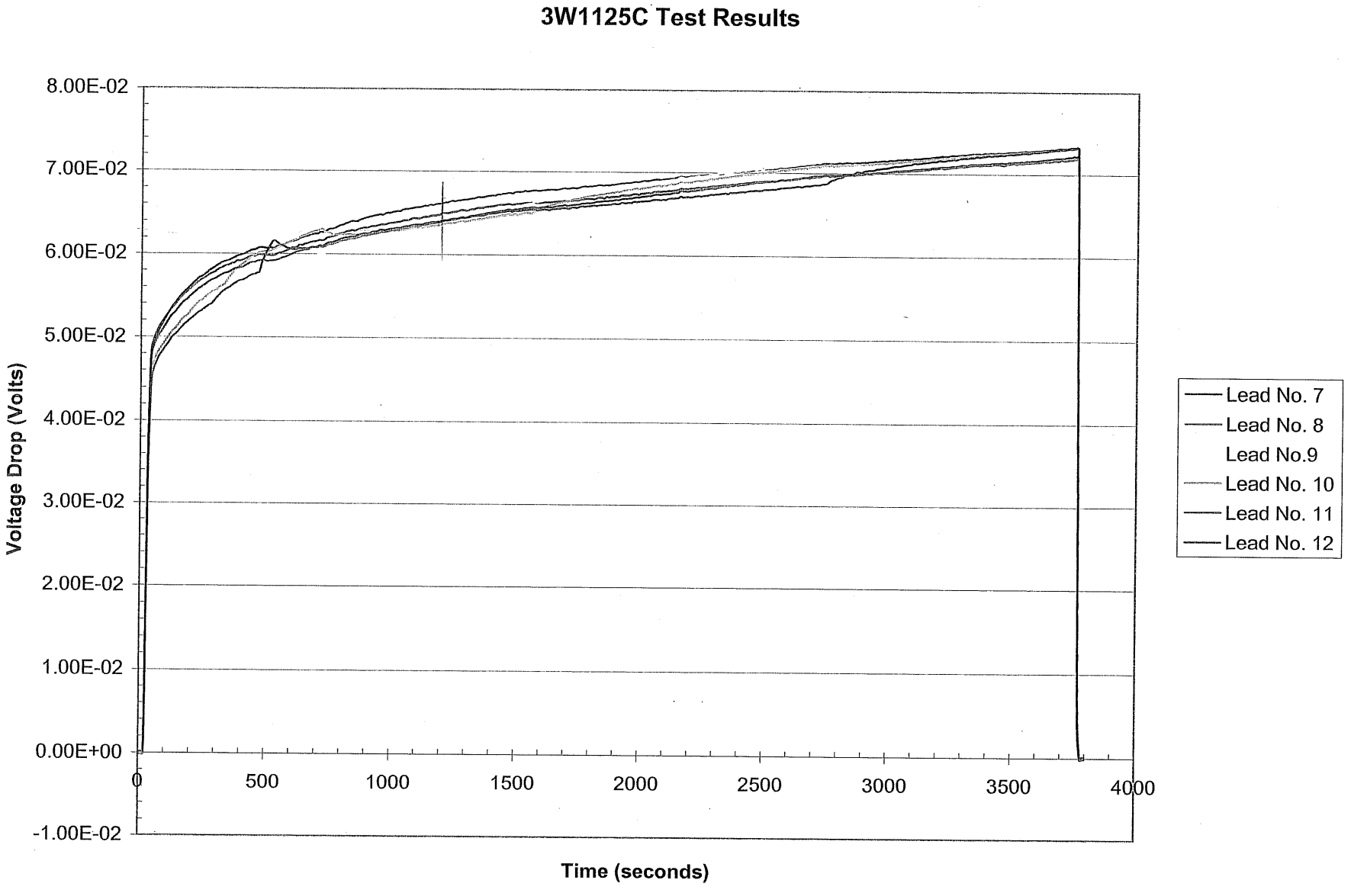

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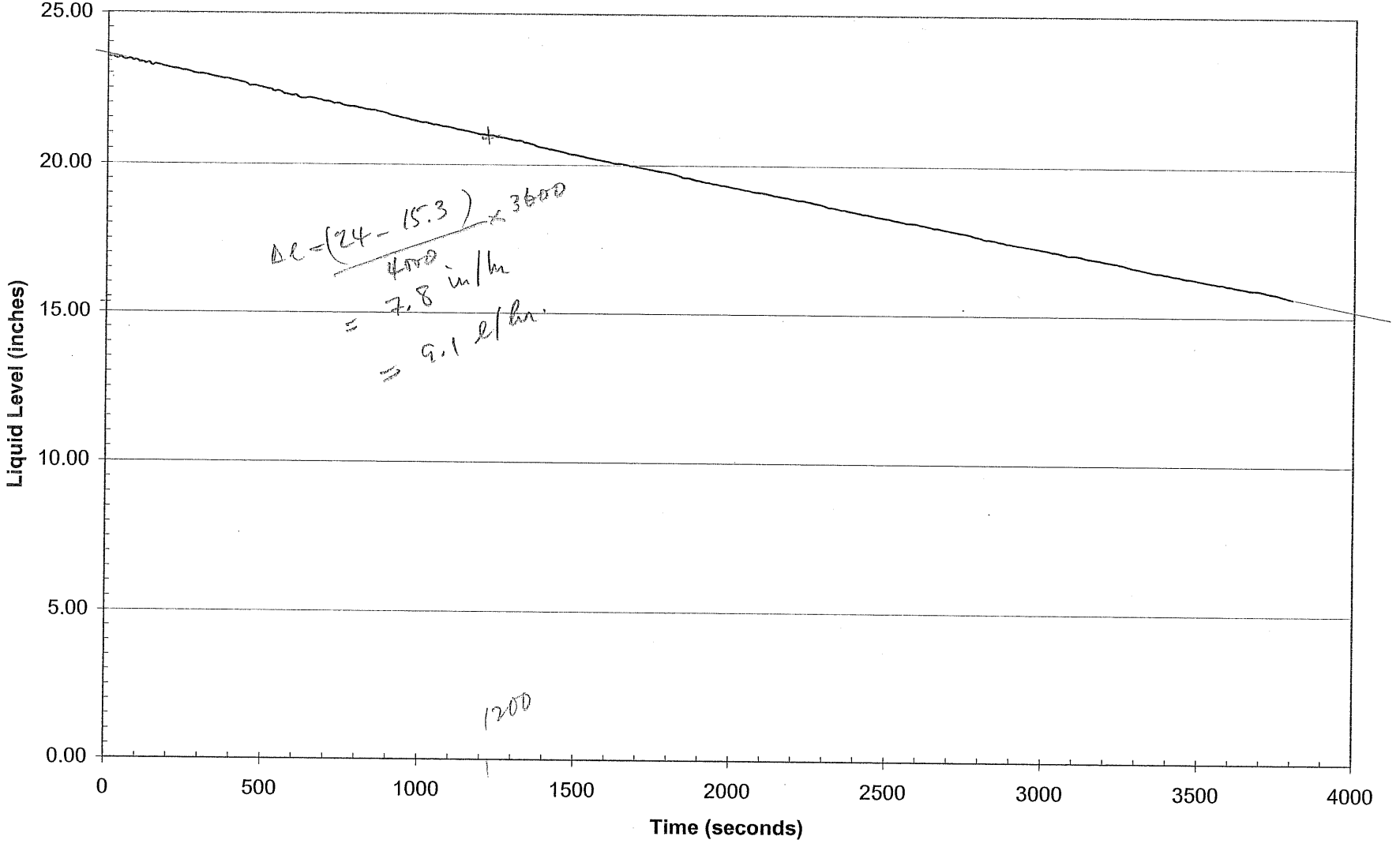
3W1125C Helium Consumption



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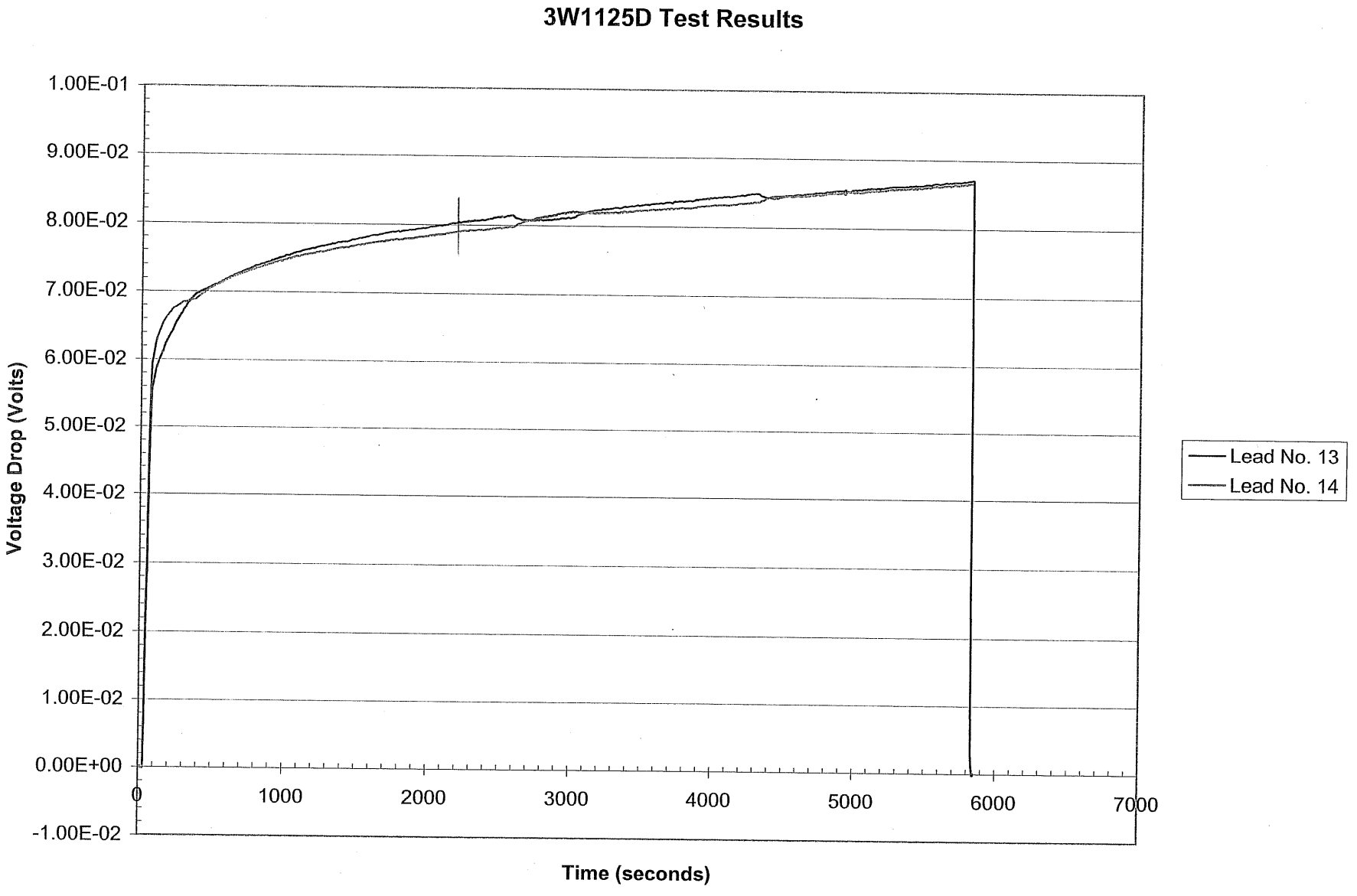

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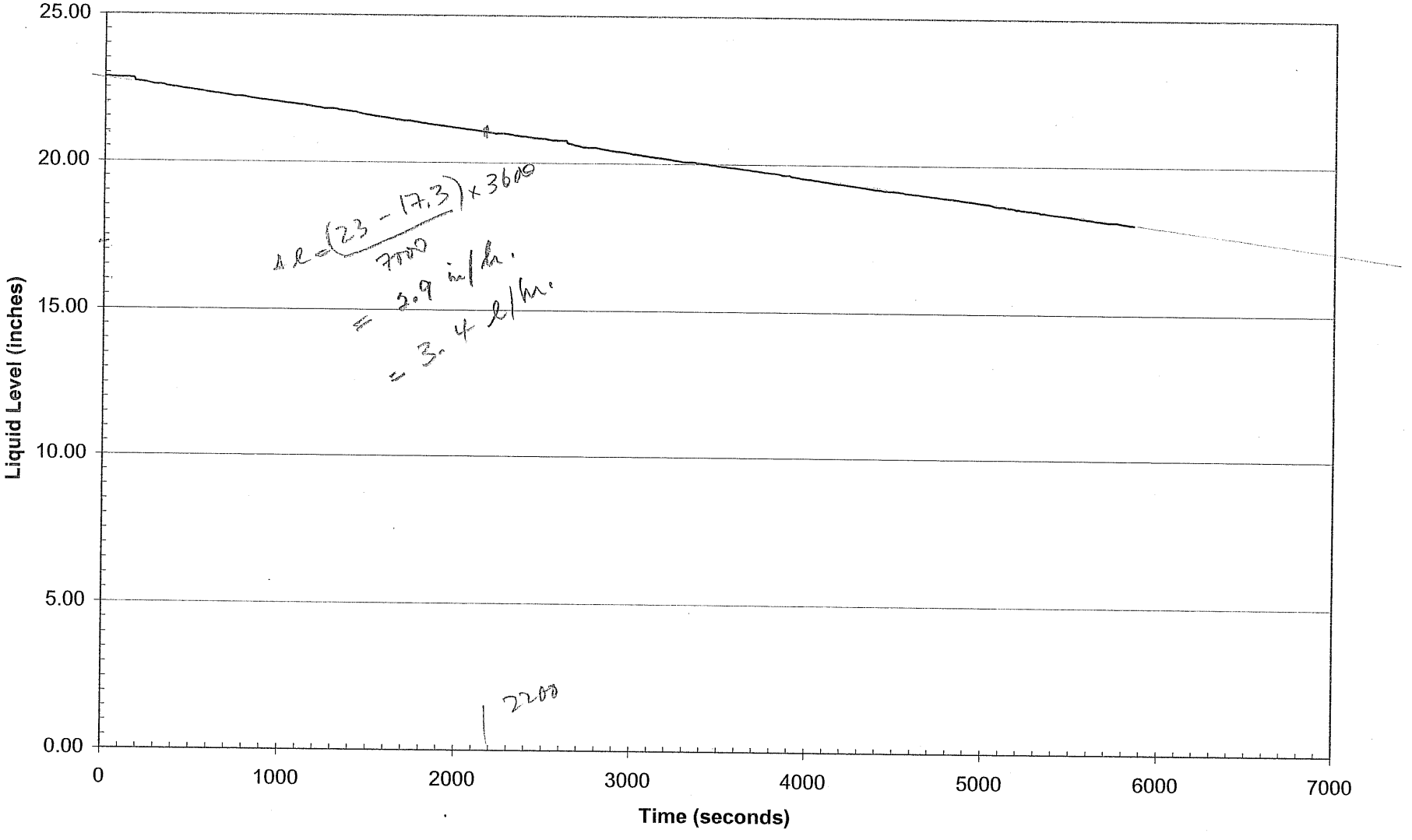
3W1125D Helium Consumption



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To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5310	**Pages:**	13
Phone:		**Date:**	11/23/03
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

4W0113A	120 Amp 5-lead pair cluster
4W0113B	600 Amp 3-lead pair cluster
4W0113C	600 Amp 3-lead pair cluster
4W0113D	600 Amp 1-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 4W0113 A

Dwg and Rev Number 03-7551-3006-R1

Test #	Test Title		Date	Technician
1	Dimensional Check			

Dimension A

Lead #1	5 23/32	5.78	1-19-04	JACK
Lead #2	5 47/64	5.25		
Lead #3	5 47/64			
Lead #4	5 23/32			
Lead #5	5 23/32			
Lead #6	5 47/64			
Lead #7	5 23/32			
Lead #8	5 23/32			
Lead #9	5 23/32			
Lead #10	5 23/32			

Dimension B

Lead #1	9 39/64	9.61	1-19-04	JACK
Lead #2	9 5/8	9.62		
Lead #3	9 5/8			
Lead #4	9 5/8			
Lead #5	9 5/8			
Lead #6	9 5/8			
Lead #7	9 5/8			
Lead #8	9 5/8			
Lead #9	9 5/8			
Lead #10	9 5/8			

Dimension C

Lead #1	39 3/16	39.19	1-19-04	JACK
Lead #2	39 3/16			
Lead #3	39 3/16			
Lead #4	39 3/16			
Lead #5	39 13/64	39.20		
Lead #6	39 3/16			
Lead #7	39 3/16			
Lead #8	39 13/64			
Lead #9	39 3/16			
Lead #10	39 13/64			

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Test #	Test Title		Date	Technician

Dimension D

Lead #1	31 1/4	31.25	1-19-04	JACK
Lead #2	31 17/64	31.26		
Lead #3	31 17/64			
Lead #4	31 17/64			
Lead #5	31 1/4			
Lead #6	31 1/4			
Lead #7	31 17/64			
Lead #8	31 1/4			
Lead #9	31 17/64			
Lead #10	31 17/64			

Dimension E

Lead #1	6	1-19-04	JACK
Lead #2	6		
Lead #3	6		
Lead #4	6		
Lead #5	6		
Lead #6	6		
Lead #7	6		
Lead #8	6		
Lead #9	6		
Lead #10	6		

Dimension F	5.140	1-19-04	JACK

Dimension G

Lead #1	0	1-19-04	JACK
Lead #2	1/64		
Lead #3	1/64		
Lead #4	1/64		
Lead #5	0		
Lead #6	0		
Lead #7	1/64		
Lead #8	0		
Lead #9	0		
Lead #10	0		

Dimension H	.002	1-19-04	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	1-12-04	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	1-13-04	RF
	Leak rate achieved?	3.4×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	1-13-04	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	1-23-04	BM
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	1-23-04	BM
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer

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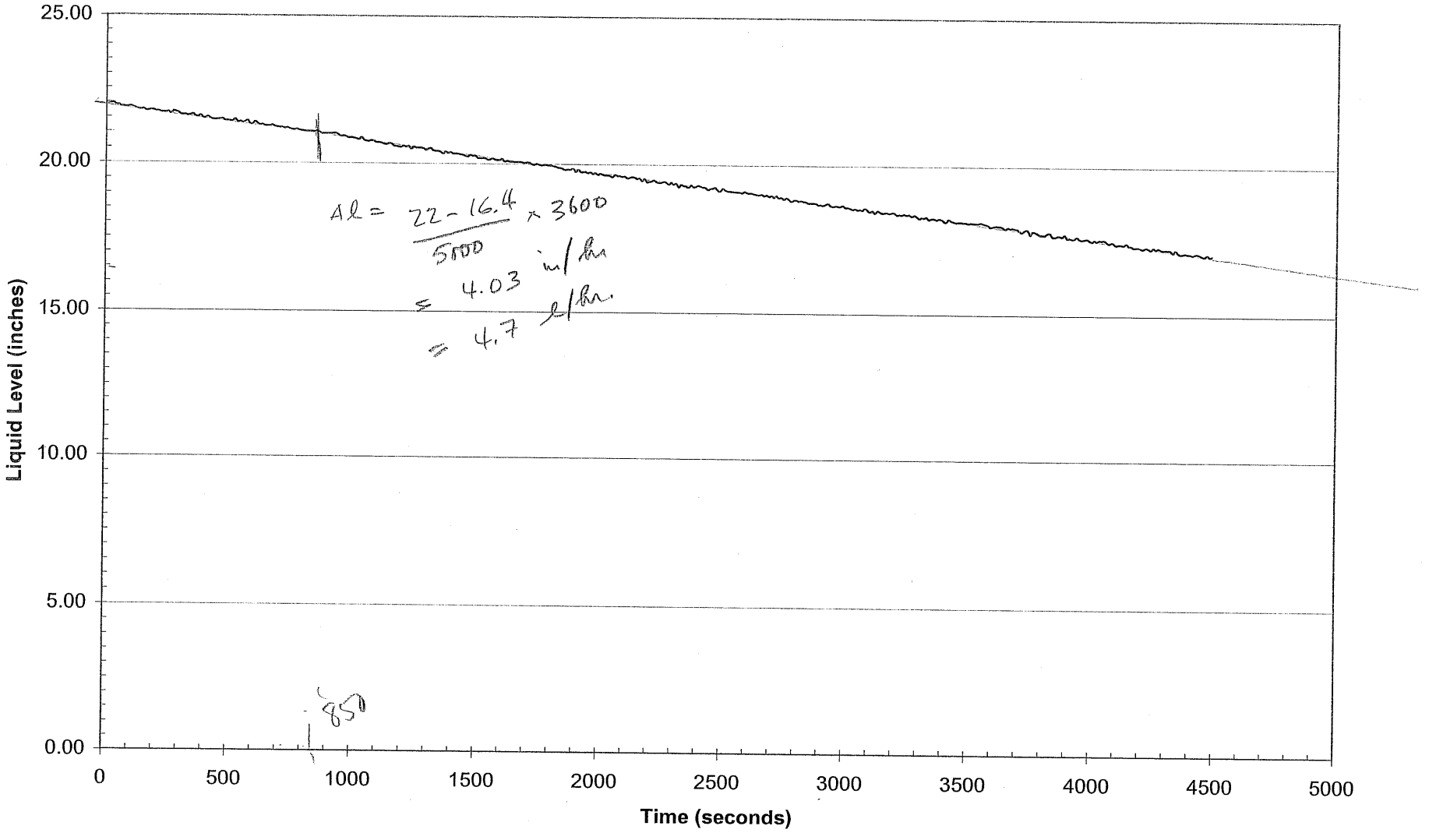
4W0113A Helium Consumption



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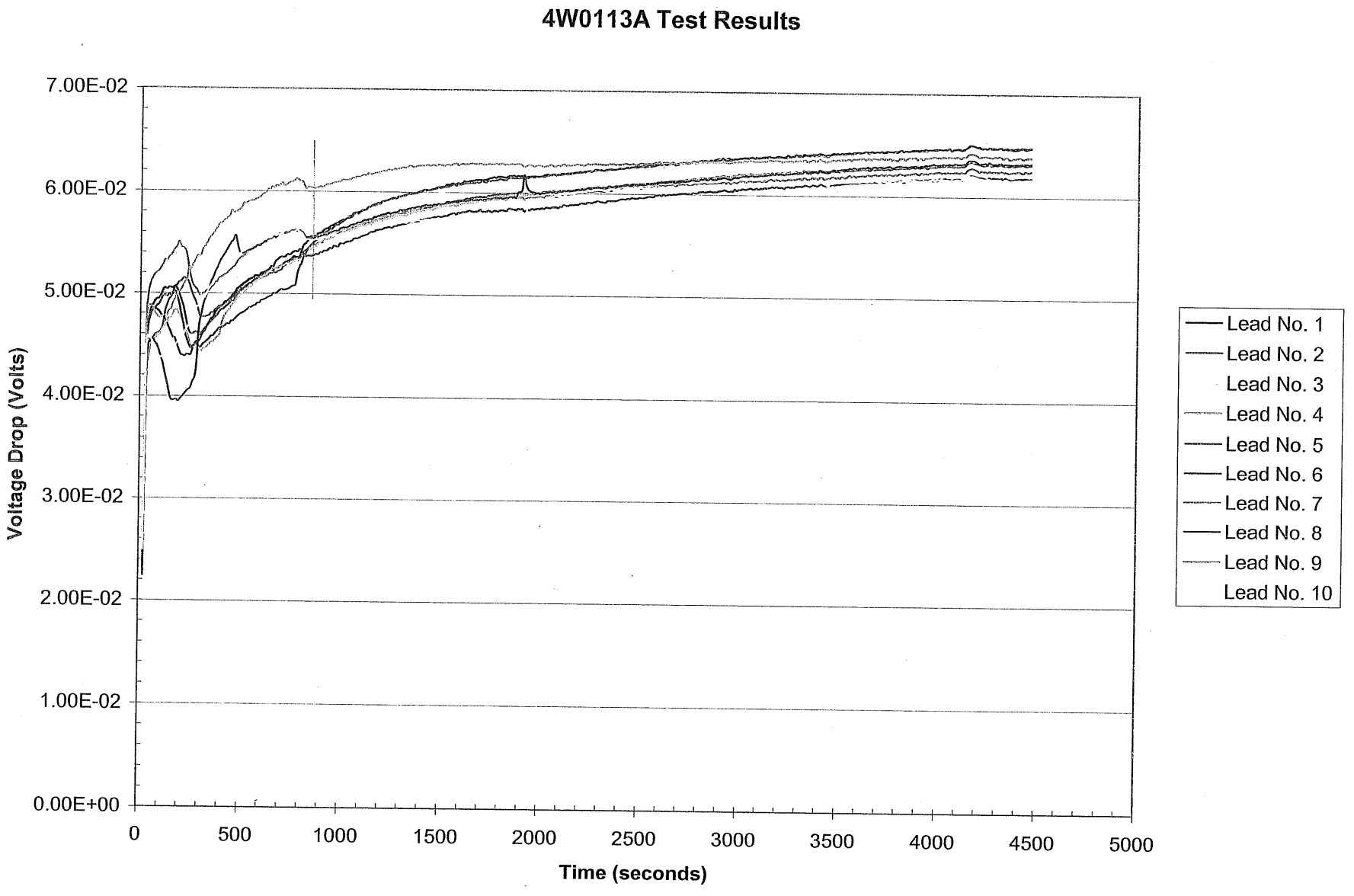

Current Lead Test Data Sheet

Current Lead Serial Number 4W0113B Dwg and Rev Number 03-9551-3005-120

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A ✓

Lead #1	4 57/64	4.89	1-19-04	JACK
Lead #2	4 7/8	4.88		
Lead #3	4 57/64			
Lead #4	4 57/64			
Lead #5	4 57/64			
Lead #6	4 57/64			
Lead				
Lead				
Lead				
Lead				

Dimension B ✓

Lead #1	9 21/32	9.66	1-19-04	JACK
Lead #2	9 21/32			
Lead #3	9 21/32			
Lead #4	9 21/32			
Lead #5	9 21/32			
Lead #6	9 21/32			
Lead				
Lead				
Lead				
Lead				

Dimension C ✓

Lead #1	39 1/8	39.12	1-19-04	JACK
Lead #2	39 9/64	39.14		
Lead #3	39 1/8			
Lead #4	39 9/64			
Lead #5	39 1/8			
Lead #6	39 1/8			
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1	30 9/32 30.28	1-19-04	JACK
	Lead #2	30 9/32		
	Lead #3	30 9/32		
	Lead #4	30 9/32		
	Lead #5	30 9/32		
	Lead #6	30 9/32		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #1	6	1-19-04	JACK
	Lead #2	6		
	Lead #3	6		
	Lead #4	6		
	Lead #5	6		
	Lead #6	6		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F	5.078	1-19-04	JACK
	Dimension G			
	Lead #1	1/64	1-19-04	JACK
	Lead #2	0		
	Lead #3	0		
	Lead #4	1/64		
	Lead #5	0		
	Lead #6	1/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.001	1-19-04	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	1-14-04	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	1-15-04	RF
	Leak rate achieved?	3.9×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	1-15-04	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	1-21-04	BM
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	1-21-04	BM
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer

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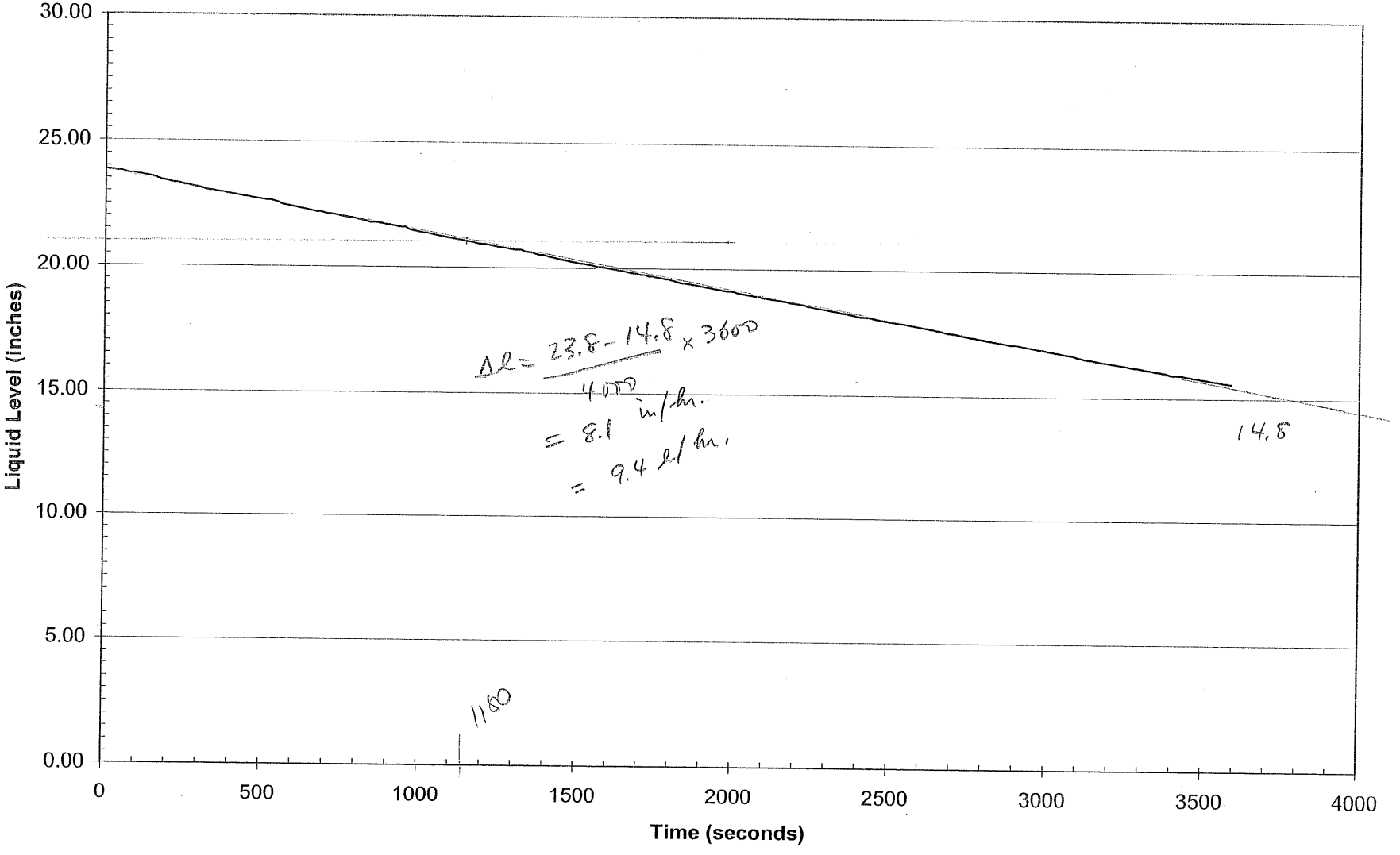
4W0113B Helium Consumption



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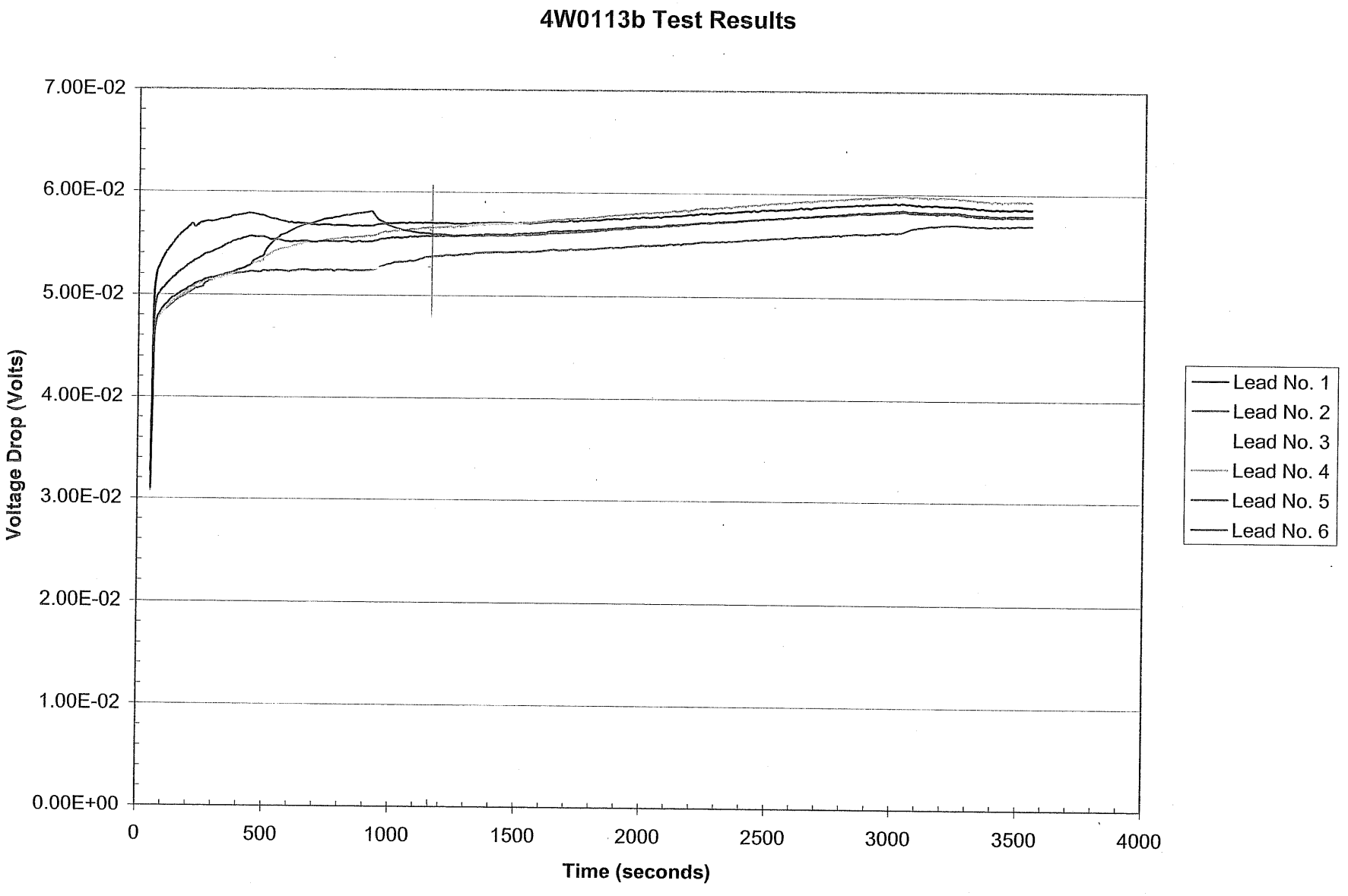

Current Lead Test Data Sheet

Current Lead Serial Number 4W0113 C Dwg and Rev Number 03-9551-3005-R6

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A ✓

Lead #7	4 57/64	4.89	1-19-04	JACK
Lead #8	4 7/8	4.88		
Lead #9	4 7/8			
Lead #10	4 7/8			
Lead #11	4 57/64			
Lead #12	4 57/64			
Lead				
Lead				
Lead				
Lead				

Dimension B ✓

Lead #7	9 21/32	9.66	1-19-04	JACK
Lead #8	9 21/32			
Lead #9	9 21/32			
Lead #10	9 21/32			
Lead #11	9 21/32			
Lead #12	9 21/32			
Lead				
Lead				
Lead				

Dimension C ✓

Lead #7	39 9/64	39.14	1-19-04	JACK
Lead #8	39 9/64			
Lead #9	39 9/64			
Lead #10	39 1/8	39.12		
Lead #11	39 1/8			
Lead #12	39 1/8			
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #7	30 19/64 30.30	1-19-04	JACK
	Lead #8	30 19/64		
	Lead #9	30 19/64		
	Lead #10	30 19/64		
	Lead #11	30 19/64		
	Lead #12	30 19/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #7	6	1-19-04	JACK
	Lead #8	6		
	Lead #9	6		
	Lead #10	6		
	Lead #11	6		
	Lead #12	6		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F	5.073	1-19-04	JACK
	Dimension G			
	Lead #7	1/64	1-19-04	JACK
	Lead #8	0		
	Lead #9	1/64		
	Lead #10	1/64		
	Lead #11	1/64		
	Lead #12	1/64		
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H	.002	1-19-04	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	1-15-04	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	1-19-04	RF
	Leak rate achieved?	1.4×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	1-19-04	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	1-20-04	BM
	Isolation voltage achieved			
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	1-20-04	BM
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer [signature]

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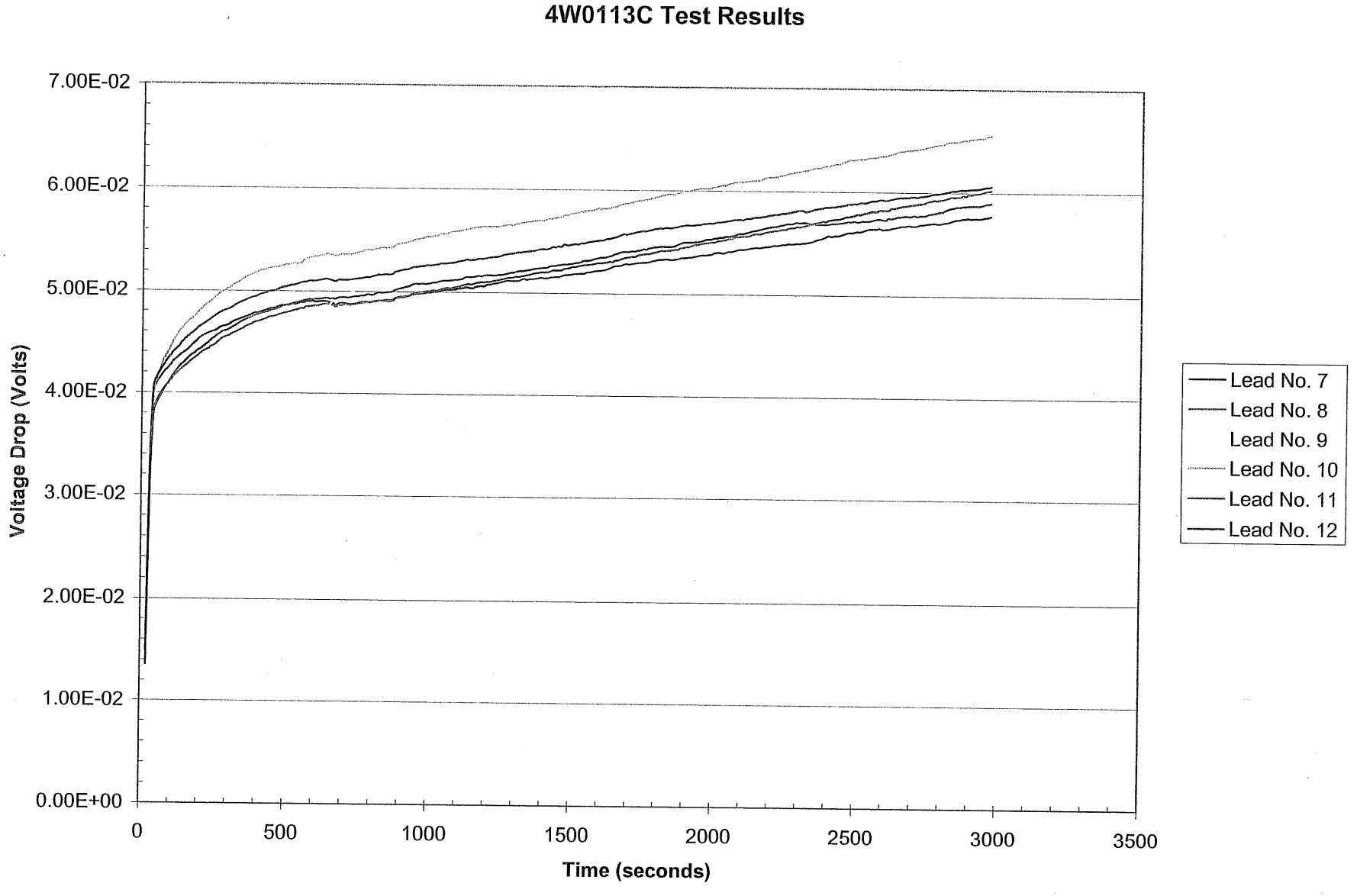

Current Lead Test Data Sheet

Current Lead Serial Number 4W0113 D Dwg and Rev Number 03-9537-3005-R0

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A

Lead #13	4 57/64	4.89	1-19-04	JACK
Lead #14	4 57/64			
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

Dimension B

Lead #13	9 21/32	9.66	1-19-04	JACK
Lead #14	9 21/32			
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

Dimension C

Lead #13	39 1/8	39.12	1-19-04	JACK
Lead #14	39 1/8			
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #13 30 19/64 30.25		1-19-04	JACK
	Lead #14 30 19/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #13 6		1-19-04	JACK
	Lead #14 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F N/A		1-19-04	JACK
	Dimension G			
	Lead #13 1/64		1-19-04	JACK
	Lead #14 1/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H .003		1-19-04	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	1-13-04	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	1-14-04	RF
	Leak rate achieved?	4.2×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	1-14-04	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	1-23-04	BM
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	1-23-04	BM
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer

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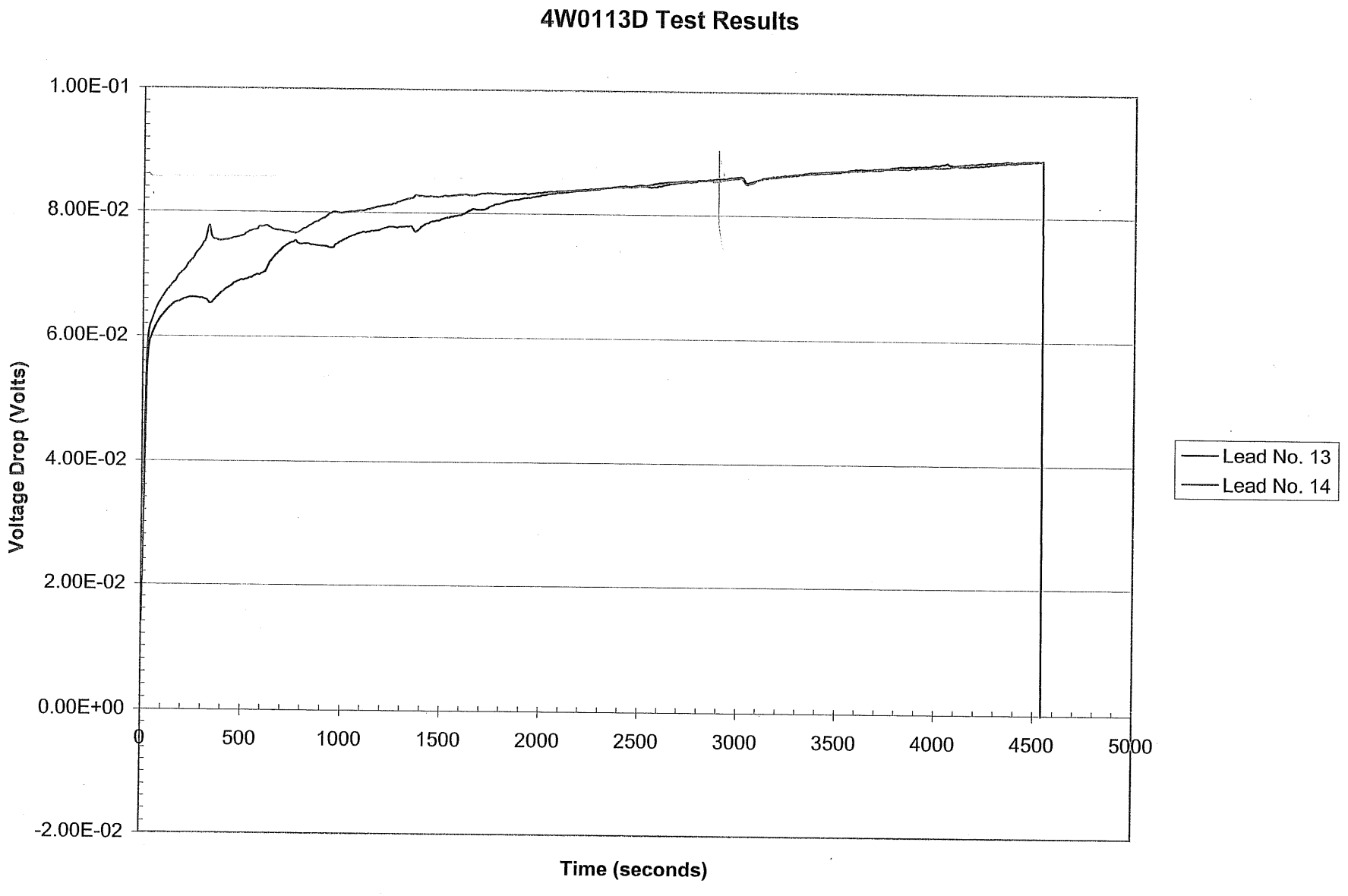

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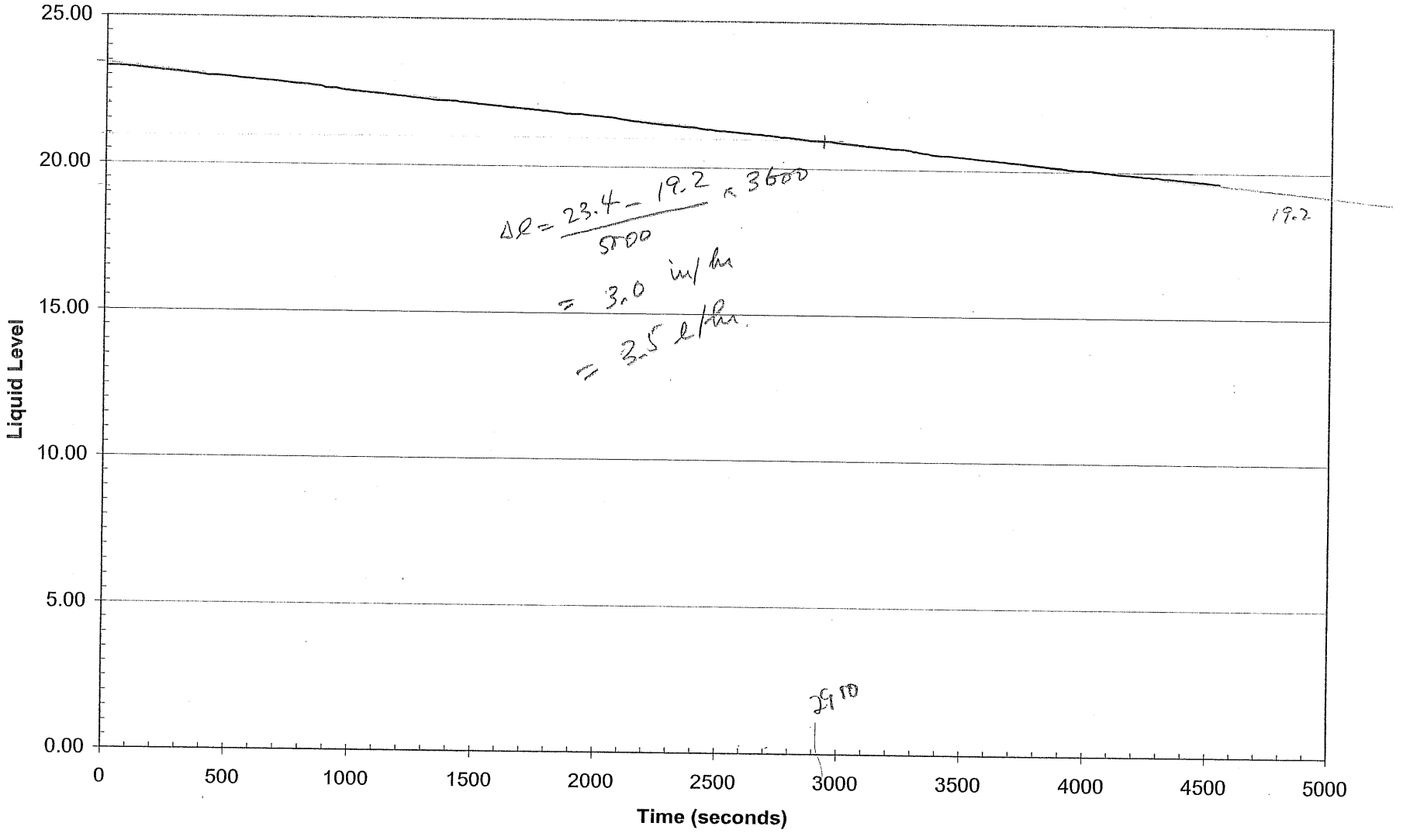
4W0113D Helium Consumption



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Fax

To:	Jon Zbasnik	**From:**	Greg Laughon
Fax:	(510) 486-5310	**Pages:**	13
Phone:		**Date:**	1/29/04
Re:	LBNL Current Lead test data	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Jon,

The test data for the first set of current leads are included in the attached sheets. The current leads are identified as follows:

4W0116A	120 Amp 5-lead pair cluster
4W0116B	600 Amp 3-lead pair cluster
4W0116C	600 Amp 3-lead pair cluster
4W0116D	600 Amp 1-lead pair cluster

Sincerely,

Greg Laughon

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Current Lead Test Data Sheet

Current Lead Serial Number 4W0116 A Dwg and Rev Number _____

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A

Lead #1	5 45/64	5.70	1-23-04	JACK
Lead #2	5 45/64			
Lead #3	5 23/32	5.72		
Lead #4	5 45/64			
Lead #5	5 23/32			
Lead #6	5 23/32			
Lead #7	5 23/32			
Lead #8	5 23/32			
Lead #9	5 47/64	5.73		
Lead #10	5 47/64			

Dimension B

Lead #1	9 39/64	9.61	1-23-04	JACK
Lead #2	9 39/64			
Lead #3	9 39/64			
Lead #4	9 39/64			
Lead #5	9 39/64			
Lead #6	9 39/64			
Lead #7	9 39/64			
Lead #8	9 39/64			
Lead #9	9 5/8	9.62		
Lead #10	9 5/8			

Dimension C

Lead #1	39 13/64	39.20	1-23-04	JACK
Lead #2	39 13/64			
Lead #3	39 13/64			
Lead #4	39 13/64			
Lead #5	39 13/64			
Lead #6	39 13/64			
Lead #7	39 13/64			
Lead #8	39 13/64			
Lead #9	39 3/16	39.19		
Lead #10	39 3/16			

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #1 31 5/16	31.31	1-23-04	JACK
	Lead #2 31 9/32	31.28		
	Lead #3 31 19/64	31.30		
	Lead #4 31 9/32			
	Lead #5 31 19/64			
	Lead #6 31 9/32			
	Lead #7 31 9/32			
	Lead #8 31 9/32			
	Lead #9 31 9/32			
	Lead #10 31 9/32			
	Dimension E			
	Lead #1 6		1-23-04	JACK
	Lead #2 6			
	Lead #3 6			
	Lead #4 6			
	Lead #5 6			
	Lead #6 6			
	Lead #7 6			
	Lead #8 6			
	Lead #9 6			
	Lead #10 6			
	Dimension F 5.140		1-23-04	JACK
	Dimension G			
	Lead #1 1/64		1-23-04	JACK
	Lead #2 0			
	Lead #3 0			
	Lead #4 0			
	Lead #5 0			
	Lead #6 0			
	Lead #7 0			
	Lead #8 0			
	Lead #9 1/64			
	Lead #10 1/64			
	Dimension H .004		1-23-04	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	1-19-04	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	1-20-04	RF
	Leak rate achieved?	4.7×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	1-20-04	BM
	Isolation voltage achieved	2KV/4KV		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	1-29-04	BM
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	1-29-04	BM
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer

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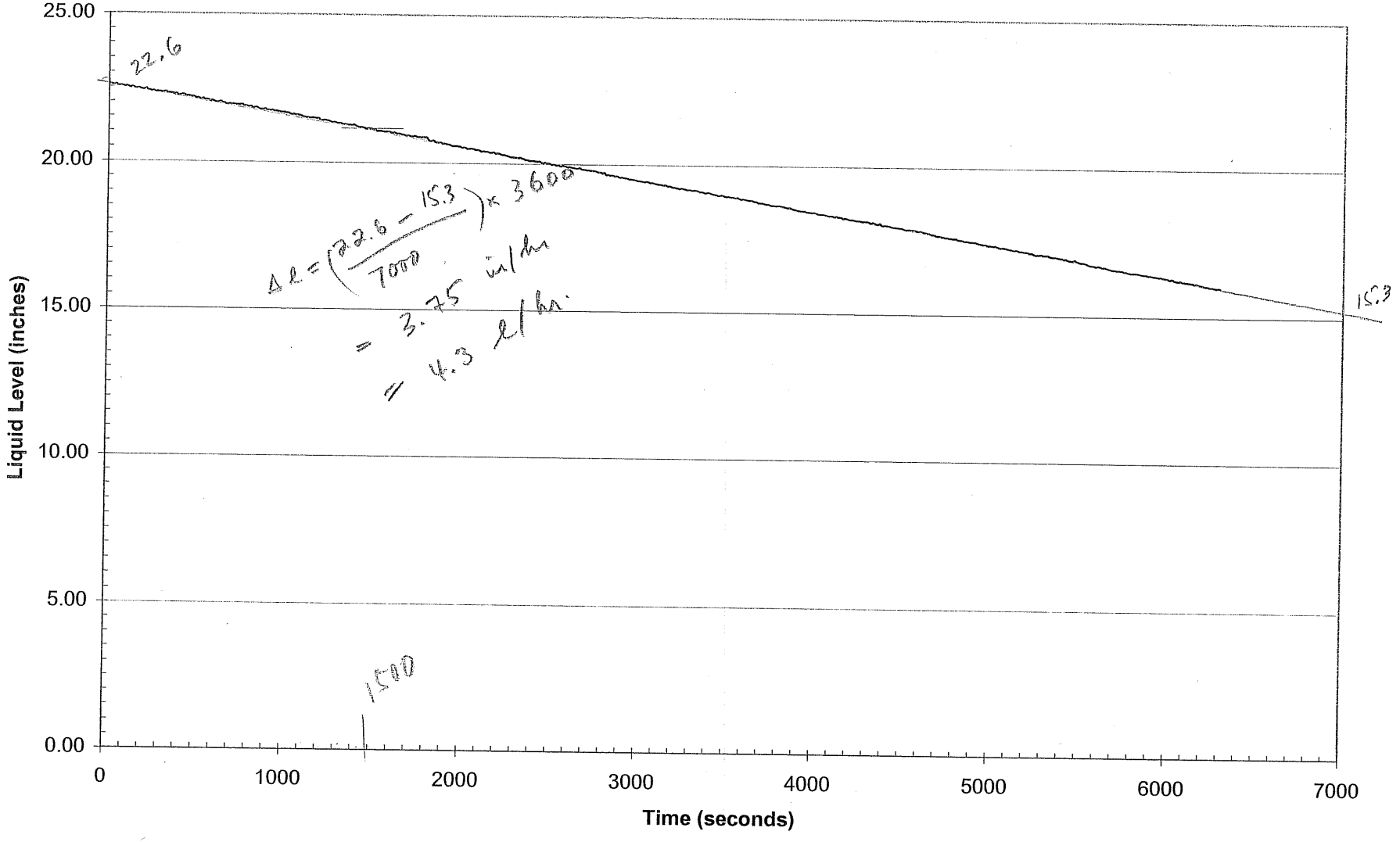
4W0116A Helium Consumption



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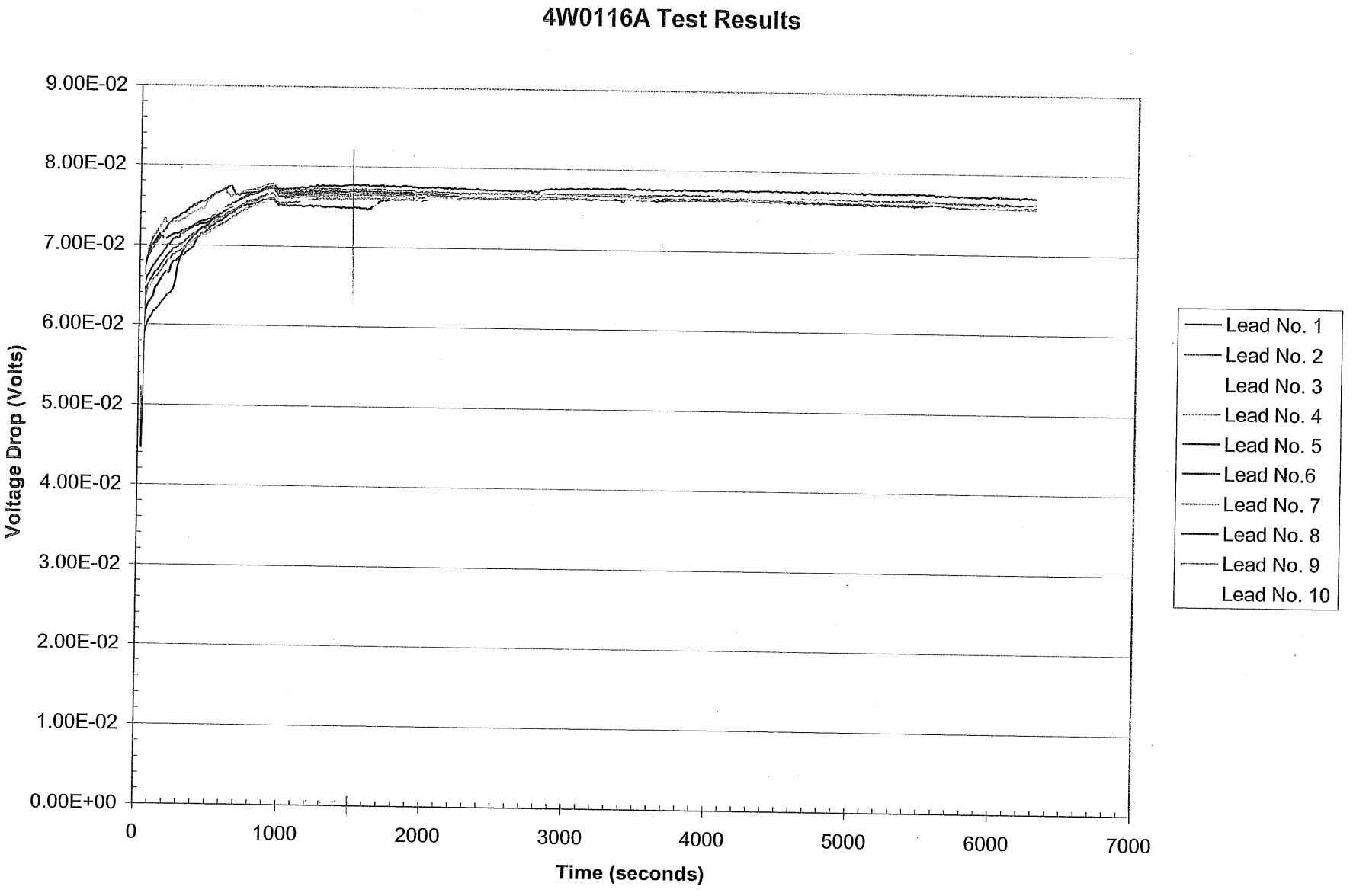

Current Lead Test Data Sheet

Current Lead Serial Number 4W0116 B

Dwg and Rev Number

1 Dimensional Check

Dimension A

Lead #1	4 57/64	4.89	1-23-04 JACK
Lead #2	4 57/64	4.89	
Lead #3	4 7/8	4.88	
Lead #4	4 7/8		
Lead #5	4 57/64		
Lead #6	4 57/64		
Lead			
Lead			
Lead			
Lead			

Dimension B

Lead #1	9 21/32	9.65	1-23-04 JACK
Lead #2	9 21/32		
Lead #3	9 21/32		
Lead #4	9 21/32		
Lead #5	9 21/32		
Lead #6	9 21/32		
Lead			
Lead			
Lead			
Lead			

Dimension C

Lead #1	39 1/8	39.13	1-23-04 JACK
Lead #2	39 1/8		
Lead #3	39 1/8		
Lead #4	39 1/8		
Lead #5	39 1/8		
Lead #6	39 1/8		
Lead			
Lead			
Lead			
Lead			

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Test #	Test Title		Date	Technician

Dimension D

Lead #1	30 19/64	30.30	1-23-04	JACK
Lead #2	30 5/16	30.31		
Lead #3	30 19/64			
Lead #4	30 19/64			
Lead #5	30 9/32	30.28		
Lead #6	30 9/32			
Lead				
Lead				
Lead				
Lead				

Dimension E

Lead #1	6	1-23-04	JACK
Lead #2	6		
Lead #3	6		
Lead #4	6		
Lead #5	6		
Lead #6	6		
Lead			
Lead			
Lead			
Lead			

Dimension F	5.074	1-23-04	JACK

Dimension G

Lead #1	0	1-23-04	JACK
Lead #2	0		
Lead #3	1/64		
Lead #4	1/64		
Lead #5	1/64		
Lead #6	0		
Lead			
Lead			
Lead			
Lead			

Dimension H	.003	1-23-04	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	1-20-04	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	1-21-04	RF
	Leak rate achieved?	3.4×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	1-21-04	SB
	Isolation voltage achieved	2Kv / 4Kv		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	1-29-04	BM
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	1-29-04	BM
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer

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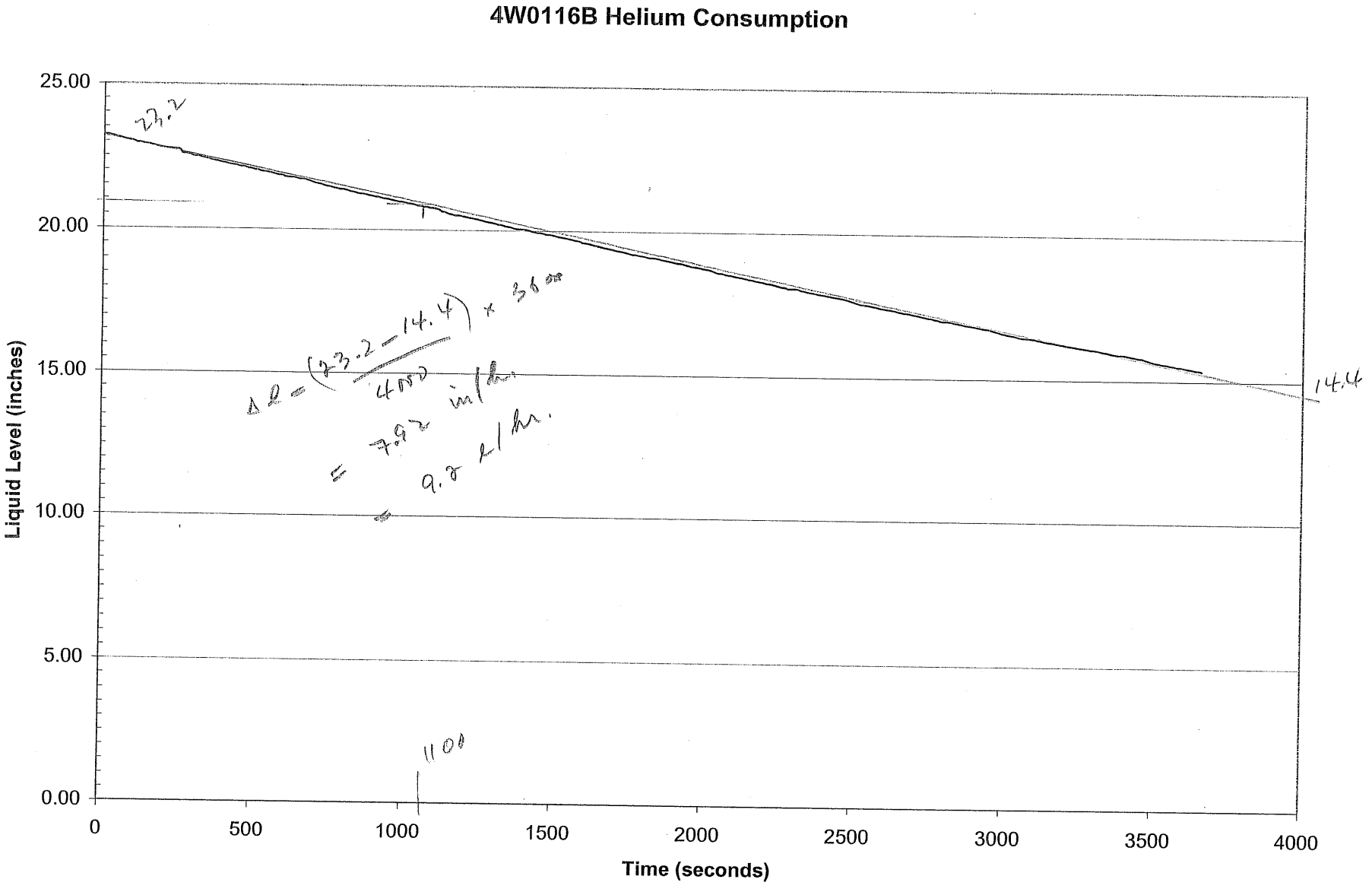

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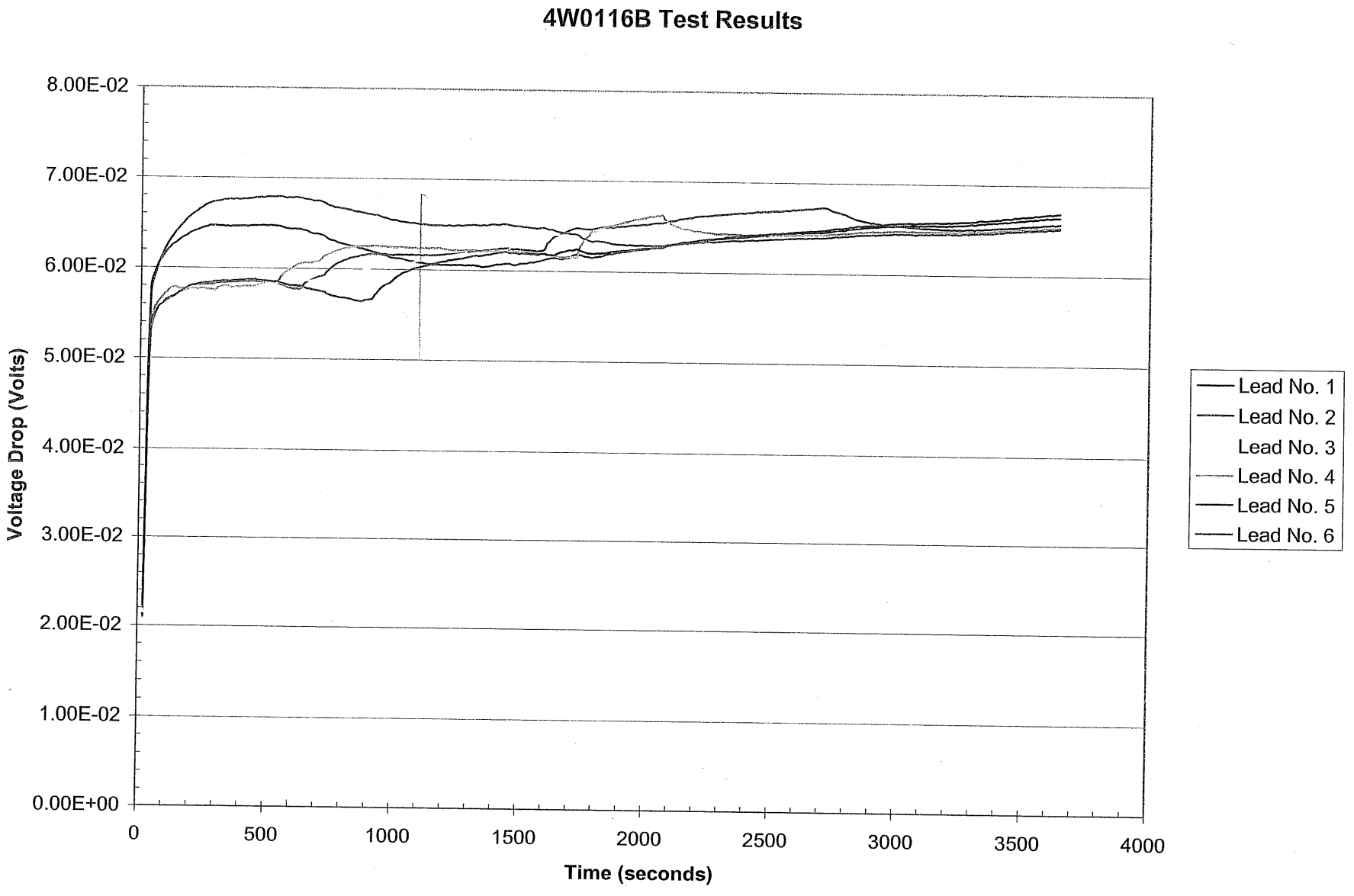

Current Lead Test Data Sheet

Current Lead Serial Number 4W0116C Dwg and Rev Number _____

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A ✓

Lead #7	4 57/64	4.89	1-23-04	JACK
Lead #8	4 57/64			
Lead #9	4 57/64			
Lead #10	4 57/64			
Lead #11	4 57/64			
Lead #12	4 29/32	4.91		
Lead				
Lead				
Lead				
Lead				

Dimension B ✓

Lead #7	9 21/32	9.66	1-23-04	JACK
Lead #8	9 21/32			
Lead #9	9 21/32			
Lead #10	9 21/32			
Lead #11	9 21/32			
Lead #12	9 21/32			
Lead				
Lead				
Lead				
Lead				

Dimension C ✓

Lead #7	39 9/64	39.14	1-23-04	JACK
Lead #8	39 1/8	39.12		
Lead #9	39 5/32	39.16		
Lead #10	39 1/8			
Lead #11	39 5/32			
Lead #12	39 3/32	39.09		
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician

Dimension D

Lead #7	30 5/16	30.31	1-23-04	JACK
Lead #8	30 19/64	30.30		
Lead #9	30 19/64			
Lead #10	30 9/32	30.28		
Lead #11	30 19/64			
Lead #12	30 19/64			
Lead				
Lead				
Lead				
Lead				

Dimension E

Lead #7	6	1-23-04	JACK
Lead #8	6		
Lead #9	6		
Lead #10	6		
Lead #11	6		
Lead #12	6		
Lead			
Lead			
Lead			
Lead			

Dimension F	5.080	1-23-04	JACK

Dimension G

Lead #7	0	1-23-04	JACK
Lead #8	1/64		
Lead #9	0		
Lead #10	0		
Lead #11	0		
Lead #12	1/64		
Lead			
Lead			
Lead			
Lead			

Dimension H	.003	1-23-04	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	1-21-04	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	1-22-04	RF
	Leak rate achieved?	4.2×10^{-9}		
4	**Voltage Isolation Test In Air**			
	Result (circle one)	Pass/Fail	1-22-04	SB
	Isolation voltage achieved	2Kv / 4Kv		
5	**Voltage Isolation Test In Dewar**			
	Result (circle one)	Pass/Fail	1-29-04	BM
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	1-29-04	BM
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer

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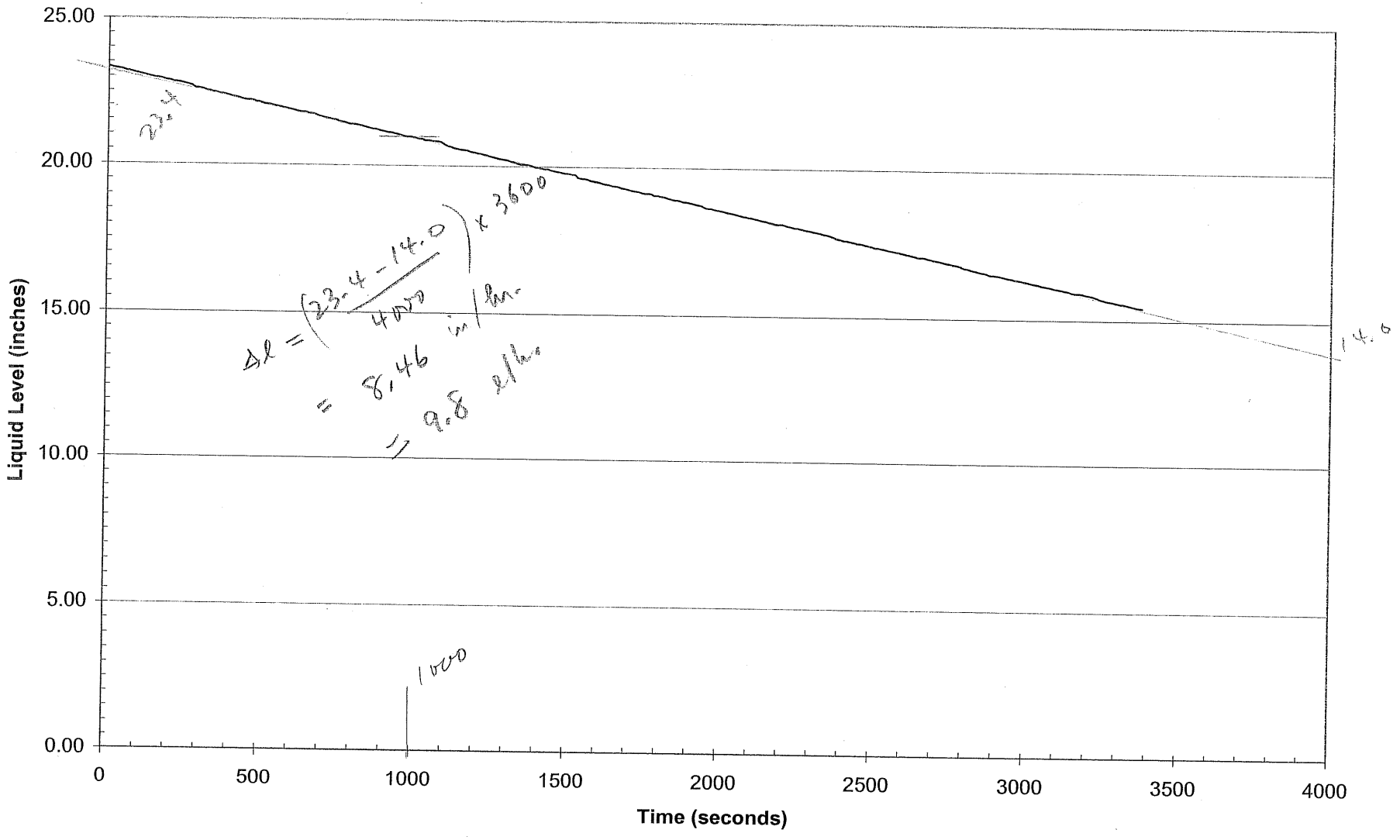
4W0116C Helium Consumption



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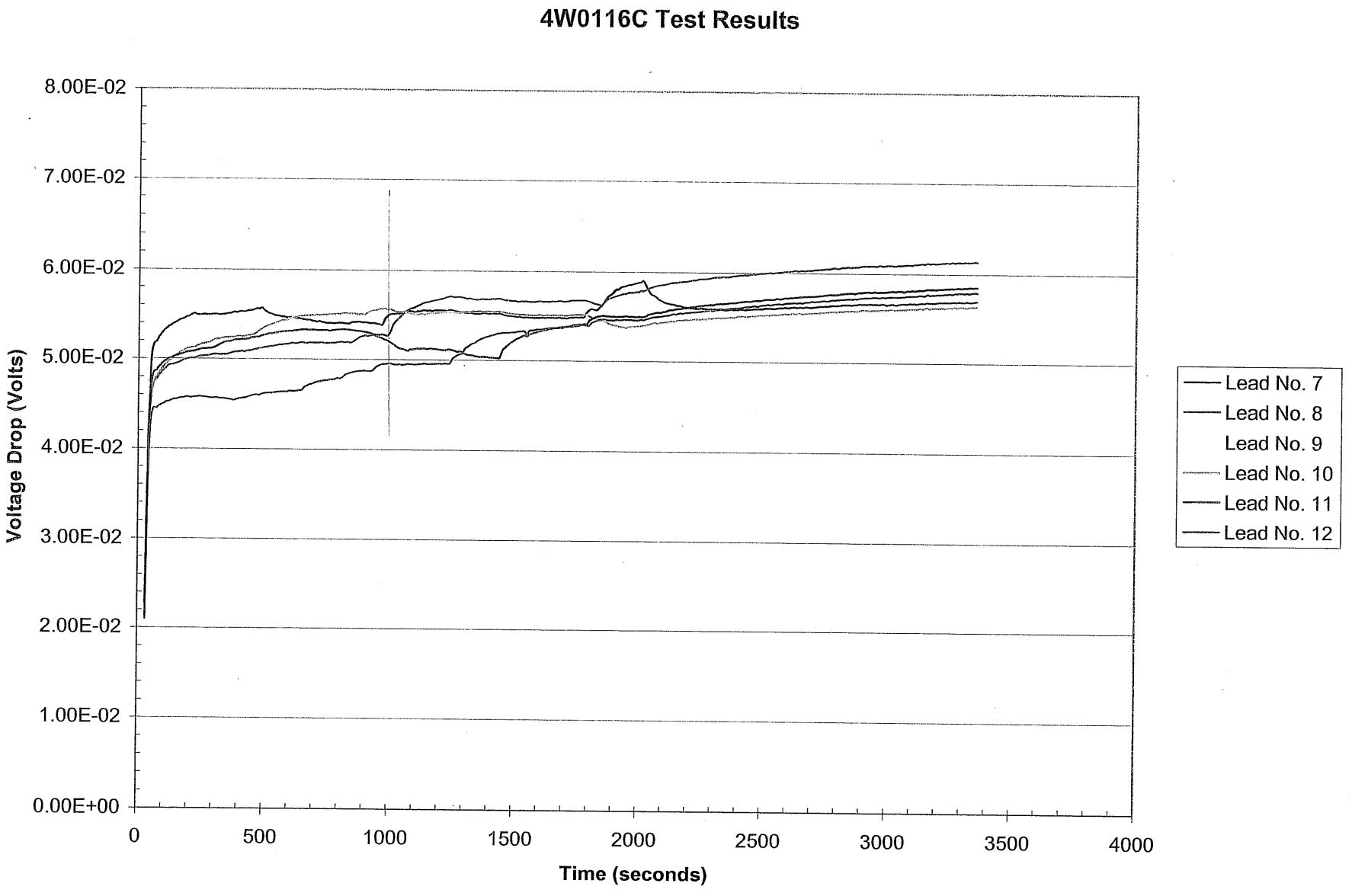

Current Lead Test Data Sheet

Current Lead Serial Number 4W0116 D Dwg and Rev Number _____

Test #	Test Title		Date	Technician

1 Dimensional Check

Dimension A ✓

Lead #13	4 57/64	4.89	1-26-04	JACK
Lead #14	4 57/64			
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

Dimension B ✓

Lead #13	9 21/32	9.65	1-26-04	JACK
Lead #14	9 21/32			
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

Dimension C ✓

Lead #13	39 5/32	39.16	1-26-04	JACK
Lead #14	39 1/8	39.12		
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				
Lead				

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Test #	Test Title		Date	Technician
	Dimension D			
	Lead #13 30 9/32 30.28		1-26-04	JACK
	Lead #14 30 9/32			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension E			
	Lead #13 6		1-26-04	JACK
	Lead #14 6			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension F N/A		1-26-04	JACK
	Dimension G			
	Lead #13 0		1-26-04	JACK
	Lead #14 1/64			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Dimension H .001		1-26-04	JACK

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Test #	Test Title		Date	Technician
2	**Pressure Test**			
	Result (circle one)	Pass/Fail	1-22-04	RF
	Degradation of pressure?	NONE		
3	**Leak Test**			
	Result (circle one)	Pass/Fail	1-23-04	RF
	Leak rate achieved?	3.5×10^{-9}		
4	**Voltage Isolation Test in Air**			
	Result (circle one)	Pass/Fail	1-23-04	SB
	Isolation voltage achieved	2Kv / 4Kv		
5	**Voltage Isolation Test in Dewar**			
	Result (circle one)	Pass/Fail	1-29-04	BM
	Isolation voltage achieved	600V		
6	**Full Current Test**			
	Result (circle one)	Pass/Fail	1-29-04	BM.
	Max voltage across lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			
	Lead			

Project Engineer

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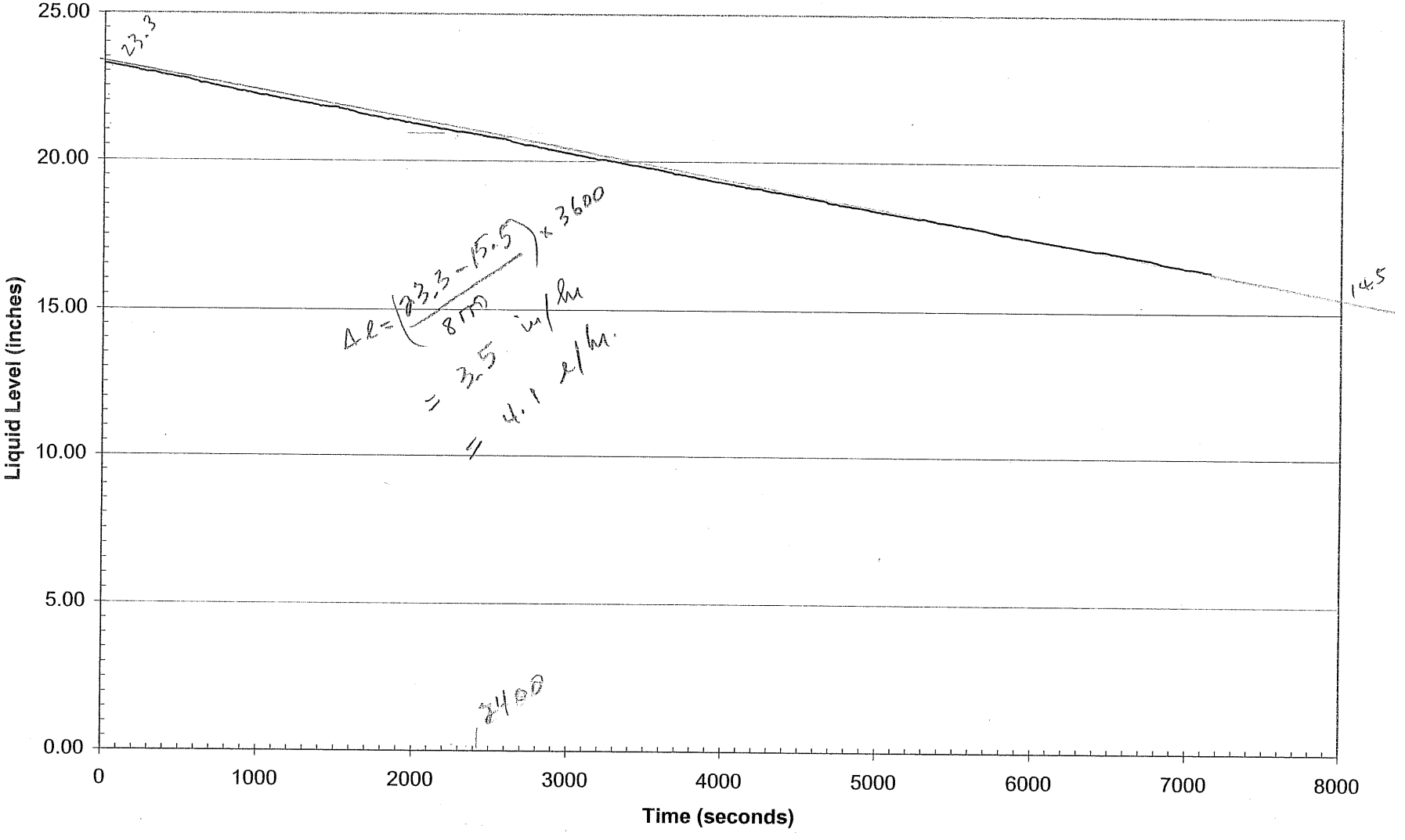
4W0116D Helium Consumption



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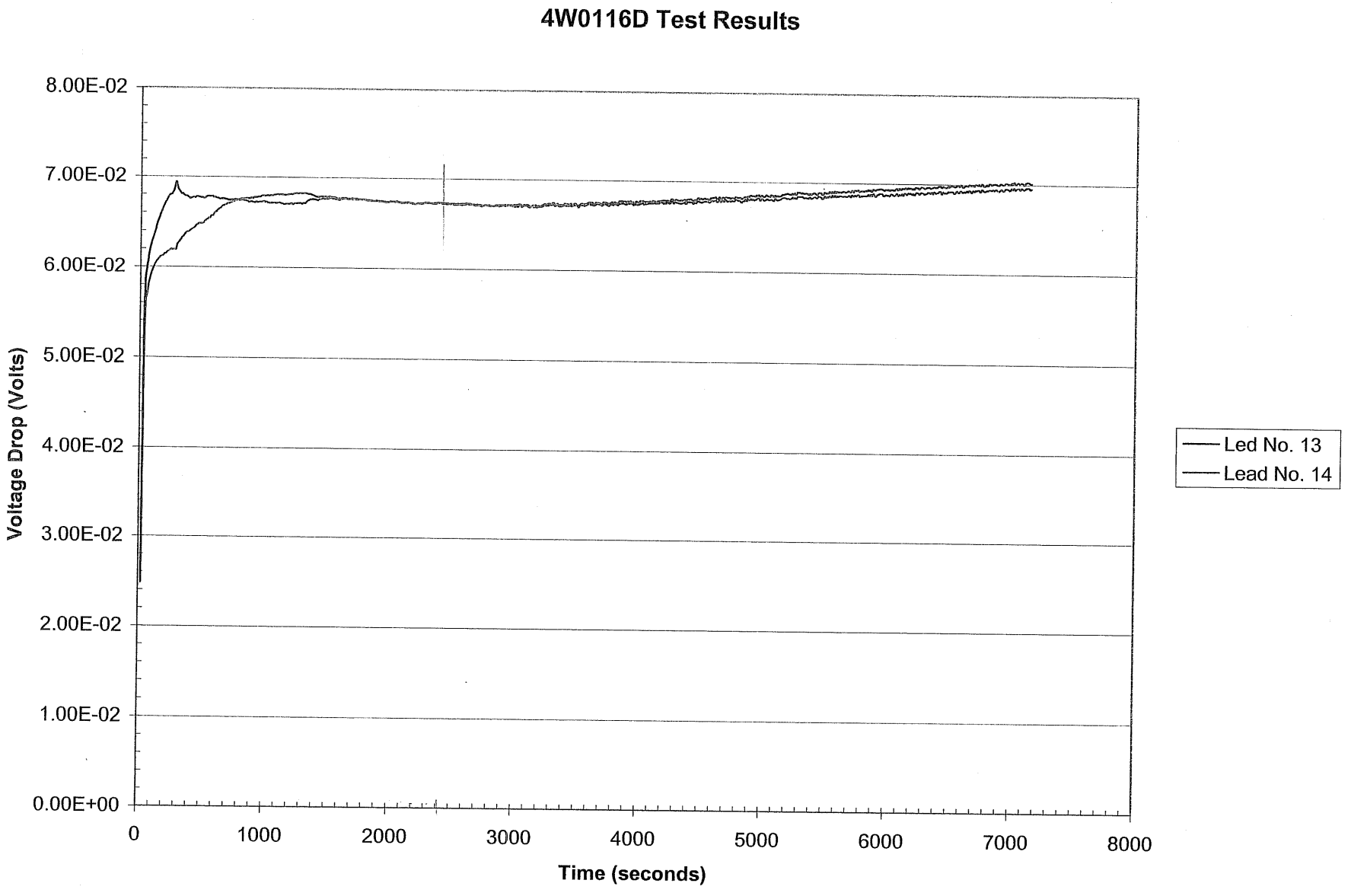
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