FINAL TECHNICAL REPORT

IMPROVEMENT OF THE MECHANICAL AND THERMAL PROPERTIES OF THE METALLIZED POLYCARBONATE CAPACITOR

GEORGE C. MARSHALL SPACE FLIGHT CENTER, CONTRACT NAS 8-32403

1655 - 26th STREET
SANTA MONICA, CALIFORNIA 90404

TITLE: IMPROVEMENT OF THE MECHANICAL AND THERMAL PROPERTIES OF THE METALLIZED POLYCARBONATE CAPACITOR

DATE: AUGUST 1977

CONTRACTOR: COMPONENT RESEARCH CO.
1655 26th St.
SANTA MONICA, CALIF. 90404

AUTHOR: HILLEL J. KELLERMAN

PREPARED FOR: GEORGE C. MARSHALL SPACE FLIGHT CENTER,
MARSHALL SPACE FLIGHT CENTER, ALABAMA
CONTRACT REPORT NO. ~~NAS. 3-1892S~~ NAS 8-32403

[redacted]

ABSTRACT:

The objective of this program was to develop design and process changes which enable polycarbonate metallized film capacitors to withstand 500 thermal shock cycles while maintaining electrical characteristic integrity without becoming intermittent, and without losing hermeticity. The task was for metallized polycarbonate film capacitors designed to meet MIL-C-39022/9 and MIL-C-83421/1. The capacitor design improvements implemented were the insertion of a rubber washer between spray cap and end seal and the utilization of a flexible lead assembly. One hundred fifty (150) capacitors incorporating the design improvements were manufactured and subsequently underwent 500 thermal shock cycles. One hundred forty nine (149) capacitors survived the test. Failure analysis revealed that the lone failure was due to a poor solder joint, initially detected in pre-screening tests as having poor Dissipation Factor and Equivalent Series Resistance measurement readings. Technician's error precluded the capacitor being eliminated from the test program.

FOREWORD

This report documents all work performed by Component Research Co. during the period 28 January 1977 to 30 June 1977 for George C. Marshall Space Flight Center under Contract NAS 8-32403. The project manager at George C. Marshall Space Flight Center was Leon Hamiter. The program manager at Component Research Co. was John Conklin.

ABSTRACT

The objective of this program was to develop design and process changes which enable polycarbonate metallized film capacitors to withstand 500 thermal shock cycles while maintaining electrical characteristic integrity without becoming intermittent, and without losing hermeticity.

The task was for metallized polycarbonate film capacitors designed to meet MIL-C-39022/9 and MIL-C-83421/1.

The capacitor design improvements implemented were the insertion of a rubber washer between spray cap and end seal and the utilization of a flexible lead assembly.

One hundred fifty (150) capacitors incorporating the design improvements were manufactured and subsequently underwent 500 thermal shock cycles. One hundred forty nine (149) capacitors survived the test.

Failure analysis revealed that the lone failure was due to a poor solder joint, initially detected in pre-screening tests as having poor Dissipation Factor and Equivalent Series Resistance measurement readings. Technician's error precluded the capacitor being eliminated from the test program.

CONTENTS

LIST OF ILLUSTRATIONS

I. INTRODUCTION

Science is continually progressing and making technological advances. To keep in step with these advances better accuracy and reliability of passive components must be assured. Demands have been made upon today's state-of-the-art capacitor that make it necessary to surpass present capacitor technology.

The requirements of the Space Shuttle Program have made it necessary to develop a polycarbonate metallized film capacitor capable of withstanding 500 thermal shock cycles while maintaining electrical characteristic integrity and hermeticity, without becoming intermittent.

II. EFFECT OF THERMAL SHOCK CYCLING ON POLYCARBONATE FILM CAPACITORS

When two materials possessing dissimilar coefficients of linear thermal expansion are fastened together and subjected to extreme temperature conditions they impart upon each other mechanical stress. The magnitude and direction of this stress is dependent on the change of temperature undergone and the exact coefficients of linear thermal expansion of the materials.

The main physical components of the capacitors in this program are the film winding, a metallic case, and two end seals.

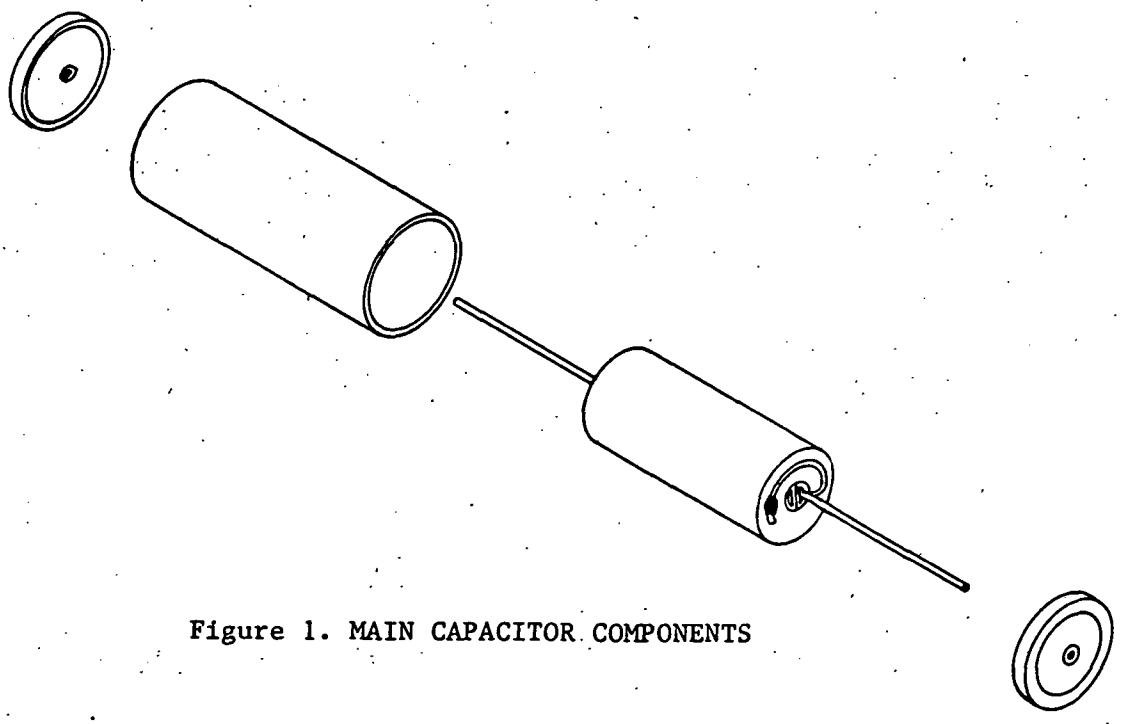

Figure 1. MAIN CAPACITOR COMPONENTS

The winding consists of metallized polycarbonate film wound on a plastic core. The metallic case is a cylindrical tube of Cupronickel 30%, Alloy 715. The end seals are circular, glass-to-metal compression seals.

Polycarbonate has a coefficient of linear thermal expansion of 70×10^{-6} per°C. Cupronickel 30% has a coefficient of linear thermal expansion of 16×10^{-6} per°C.

Due to the differences of coefficients of linear thermal expansion the capacitor winding will expand a greater magnitude than the case above ambient temperature. At temperatures below ambience the winding will contract a greater magnitude than the Cupronickel case. What interests us is the expansion and contraction along the axis of the capacitor.

Let us analyze what happens during capacitor exposure to extreme temperatures:

At temperatures above ambience both the winding and case begin to expand. The winding, possessing a higher coefficient of linear thermal expansion than the case, expands a greater magnitude and therefore compresses against the end seals.

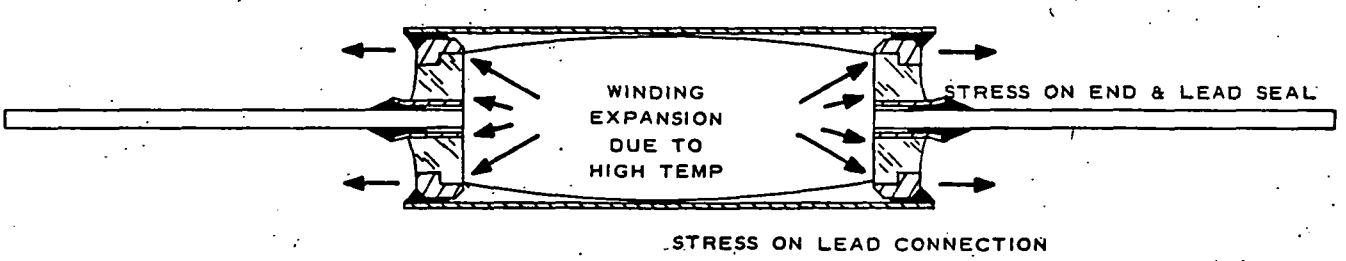

Figure 2. WINDING EXPANDING AGAINST END SEALS DUE TO HIGH TEMPERATURE

The effect is that the solder joint bonding the lead assembly to the spray cap is pushed through the thin mantle of tin babbit. This situation is analagous to an ice skater standing on a thin layer of ice. The ice breaks away from the surface at the points of pressure, the skater's feet. So too here, the section of tin babbit under the solder joint breaks away from the spray cap surface. All this results in an intermittent connection, a poor Dissipation Factor, and subsequently after extensive exposure to thermal cycling, the occurrence of an open connection.

At temperatures below ambience the winding and case both contract. Due to their inherent coefficients of linear thermal expansion the winding contracts a greater distance from its original size than does the case. The effect is a "tug of war" between the core and case with the lead wire being pulled from both ends.

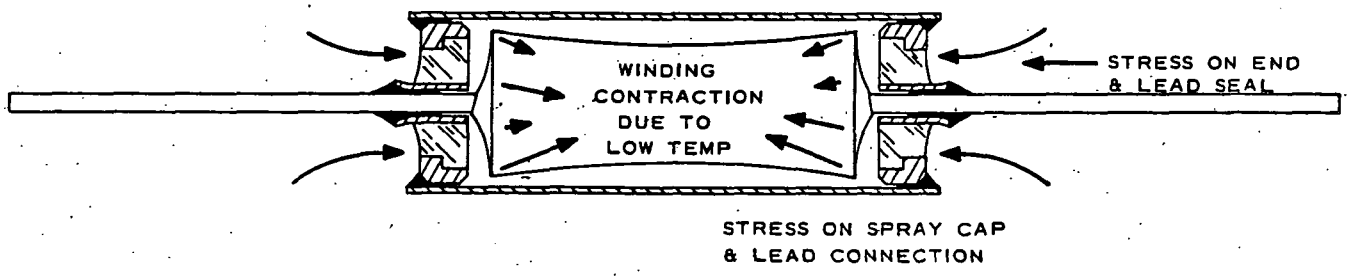

Figure 3. WINDING CONTRACTING AND PULLING LEADS FROM END SEALS DUE TO LOW TEMPERATURE

The stress along the lead wire can result in three possibilities:

1. The lead wire can pull away from the spray cap causing a poor connection, poor Dissipation Factor and eventually an open circuit.
2. The solder bead joint bonding the lead wire to the end seal becomes broken resulting in the loss of hermeticity.
3. Both 1. and 2. can occur.

III. PROPOSED DESIGN CHANGES

After having determined the causes which effect failure of metallized polycarbonate film capacitors due to thermal shock cycling, Component Research Co. proposed certain design changes:

1. To alleviate the problem present at high temperature (i.e. the crushing of the solder joint bonding the lead wire assembly and spray cap) a rubber washer was inserted between the capacitor spray cap and end seals.

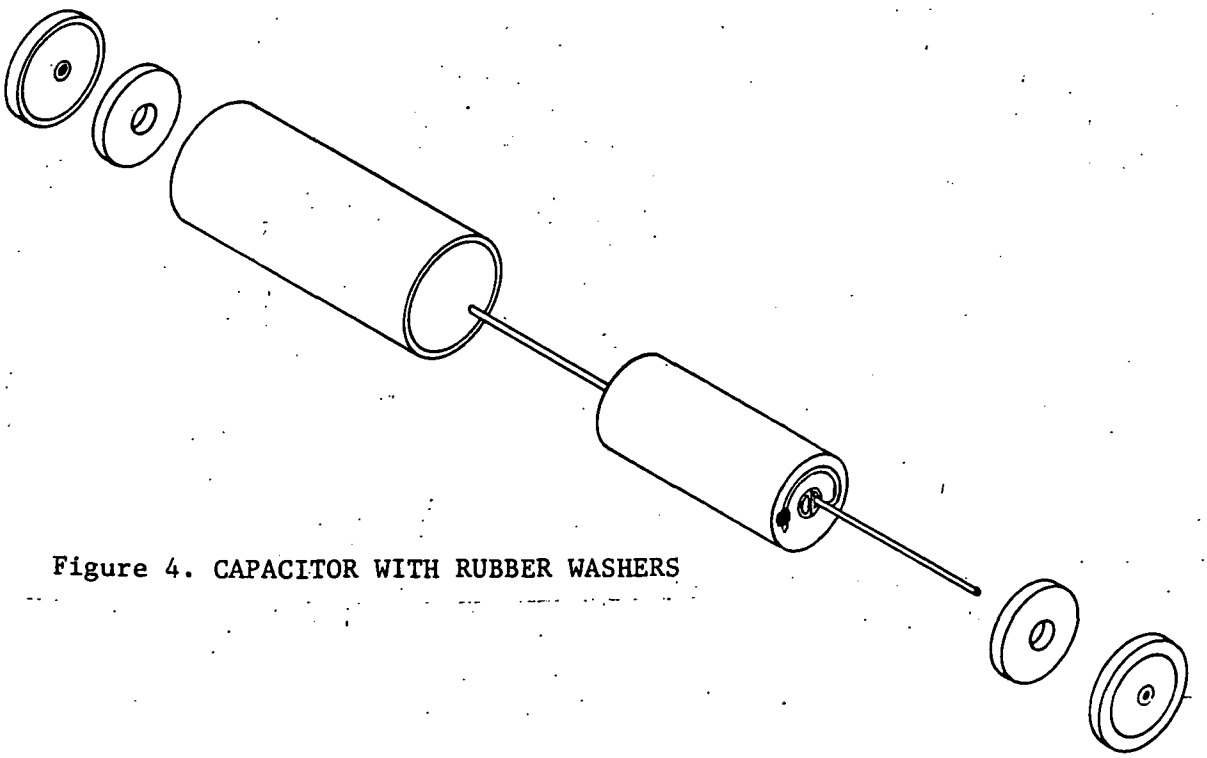

Figure 4. CAPACITOR WITH RUBBER WASHERS

2. To solve the problems which occur due to contraction at low temperatures

(i.e. breaking of solder bead joint and pulling away of lead wire assembly from the spray cap) a patented flexible lead assembly was utilized (Patent No. 3,260,906).

Figure 5. FLEXIBLE LEAD DESIGN

IV. ENVIRONMENTAL AND ELECTRICAL TESTS

The following capacitors were manufactured per MIL-C-83421/1:

M83421/01-	Capacitance	Voltage	Diameter	Length
-1090	.01uF	30	.170 in. (4.32mm)	.500 in. (12.70mm)
-1174	.1 uF	30	.193 in. (4.90mm)	.687 in. (17.45mm)
-1186	.15uF	30	.235 in. (5.97mm)	.562 in. (14.27mm)

After incorporating the design changes outlined in Section III, the following environmental and electrical tests were performed:

A. ENVIRONMENTAL EXPOSURE

1. Accelerated temperature cycling

Twenty (20) pieces of each part number were subjected to 500 thermal shock cycles in liquid-to-liquid, at the rate of fifty (50) cycles per day. The capacitors were immersed into each liquid for sixty (60) seconds and transferred from one bath to another within fifteen (15) seconds. The temperature extremes were -55°C and 125°C.

2. Normal temperature cycling

Thirty (30) pieces of each part number were subjected to 500 thermal shock cycles in air-to-air, at the rate of one (1) cycle per hour. The dwell time at each temperature extreme was a minimum

of thirty (30) minutes. The maximum transfer time from one chamber to another was sixty (60) seconds. The temperature extremes were -55°C and 125°C.

B. ELECTRICAL TESTING

All capacitors were 100% tested for Insulation Resistance, Capacitance Drift, Dissipation Factor and Equivalent Series Resistance.

Measurements were taken as follows:

1. Insulation Resistance at rated voltage @25°C and @-55°C. I.R. @125°C at 50% rated voltage.
2. Capacitance Drift (at 1KHz) @25°C, @-55°C and @125°C.
3. Dissipation Factor (at 1KHz) @25°C, @-55°C and @125°C.
4. Dissipation Factor (at 10 KHz) @25°C, @-55°C and @125°C.
5. Equivalent Series Resistance (at 100KHz) @25°C.

C. VISUAL INSPECTION

All capacitors were visually inspected at 10X magnification for damage and solder defects before and after each cycle period.

D. HERMETICITY TEST

Capacitors were tested for hermeticity per MIL-STD-202, Method 112, Condition C, Procedure IIIA, followed by Condition A.

E. MEASUREMENT POINTS

Electrical, visual, and hermeticity test measurement points occurred as follows:

1. Accelerated temperature cycling- measurements were taken after 0, 50, 150, 250, 350, and 500 cycles.
2. Normal temperature cycling- measurements were taken after 0, 20, 140, 260, 380, and 500 cycles.

V. TEST DATA

In order to pass qualification tests per MIL-C-83421/1, Level 1, metallized polycarbonate film capacitors are required to survive ten (10) thermal shock cycles.

The capacitors listed as rejects on the proceeding data sheets are not failures but are parts which, after extensive thermal shock cycling, have fallen out of specification as delineated in MIL-C-83421/1.

After 500 thermal shock cycles, all parts passed a hot oil seal test as set forth in MIL-STD-202, Method 212, Condition A. Out of a total of one hundred fifty (150) capacitors, sixteen (16) had a leak rate faster than 1×10^{-6} Atm./Cm.^{3}/Second, the leak rate limit set forth in MIL-STD-202, Method 112, Condition C, Procedure IIIA. All capacitors had a leak rate less than 1×10^{-4} Atm./Cm.^{3}/Second.

COMPONENT RESEARCH CO.,INC.

TEST REPORT SUMMARY

Thermal Shock
Liquid to Liquid
500 Cycles -65°C to +125°C

TEST NO.
Report No. XT-1218-B

PROD. NO. 0237G
LOT
LOT SIZE 20
C.R.C. P/N M83421/01-117~~H~~R
DATE COMPLETED 5/5/77

CUSTOMER NASA, Marshall Space Flight Center
CUSTOMER P/N
CUSTOMER P/O NAS8-32403
C.R.C. S/O 704-35622

TEST	REQUIREMENT	METHOD PARAGRAPH	ACC / REJ
Insulation Resistance	3.11	4.77	20 / 0
Capacitance	N/A	4.7.8	20 / 0
Dissipation Factor	3.13	4.7.9	20 / 0
E.S.R.			20 / 0
Seal Test	3.9	4.7.5	20 / 0

QUALITY CONTROL DATE

SHIPPING DATA

ORDER #	DATE SHIPPED	QTY SHIPPED	INVOICE #	QTY STOCKED

N/A

F-634-3

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 12 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 23 F/T
TEST NO. XT 1218-B	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. 30VDC	

C.R.C. P/N M83421/01-1174 R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION:
MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
30pA maximum or 3,000,000 megohms minimum.
After 500 cycles liquid to liquid thermal shock
There are no established limits for maximum leakage current @ +25°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	H.P. 425A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter	Simpson 260	1357
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	2	12	8	23	15	13		
002	6	12	9	10	21	19		
003	4	13	11	15	19	19		
004	6	10	9	29	21	12		
005	3	7	9	7	9	12		
006	4	5	10	6	8	11		
008	9	6	10	24	13	10		
009	2	5	9	5	7	11		
010	22	5	9	7	9	13		
011	8	5	9	15	12	10		
012	12	6	10	13	13	17		
013	14	5	15	24	29	17		
014	3	6	12	9	11	16		
015	2	4	8	5	8	10		
016	2	4	8	17	11	10		
TEST DATE	2-24-77	3-8-77	3-10-77	3-23-77	4-19-77	5-4-77		
TEST BY	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ 25°C (Terminal to Terminal)

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	4	6	8	20	12	9		
018	4	8	10	16	13	10		
019	8	5	7	8	7	11		
020	3	4	9	16	12	8		
021	2	5	8	7	12	8		
TEST DATE	2-24-77	3-8-77	3-10-77	3-23-77	4-19-77	4-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street • Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 23 FIT
TEST NO. XT 1218-B	ENGR. O.K.
TEST TEMP. -55°C	Q.A.
TEST VOLT. 30VDC	

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55 to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
NOTE: There are no established limits for maximum leakage current @ -55°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	H.P. 425A	1480
I.R. Test rack	CRC None	647
D.C. Volt ohm meter	Simpson 260	1357
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588
Battery pack	N/A	

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	23	50	17	9	17	16		
002	29	13	10	7	20	15		
003	21	15	16	8	20	15		
004	20	15	17	9	19	18		
005	25	15	16	8	21	11		
006	20	15	15	6	20	16		
008	25	14	14	9	18	14		
009	21	15	15	8	18	20		
010	29	14	13	21	19	16		
011	21	14	13	17	19	16		
012	28	14	15	18	8	30		
013	28	14	23	17	8	21		
014	24	14	11	16	16	23		
015	23	14	11	17	4	25		
016	25	17	12	15	12	22		
TEST DATE	3-[illegible]-77	3-8-77	3-16-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street • Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 15 OF 188

TEST: Insulation Resistance @ -55°C (Terminal to Terminal)

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R
CUST P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	21	16	11	17	14	25		
018	20	16	12	15	12	10		
019	27	15	16	14	15	15		
020	29	15	16	10	17	22		
021	30	15	15	10	17	20		
TEST DATE	3-1-77	3-8-77	3-16-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 16 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. 23 FIT
TEST NO. XT 1218-B	ENGR. O.K.
TEST TEMP. 125°C	Q.A.
TEST VOLT. 18VDC	

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
1500 pA maximum or 12,000 megohms minimum
After 500 cycles liquid to liquid thermal shock there are no established limits for maximum leakage current @ +125°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	H.P. 425A	1480
I.R. Test rack	CRC none	647
D.C. volt ohm meter	Simpson 260	1357
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	400	210	134	250	245	460		
003	1150	470	630	870	710	470		
003	690	600	360	480	500	200		
004	370	250	160	210	320	320		
005	320	200	130	360	270	230		
006	720	230	150	370	360	230		
006	470	270	160	270	270	180		
009	280	190	145	380	230	1150		
010	550	370	150	360	300	1100		
011	950	560	340	740	1750	165		
012	750	260	210	310	258	450		
013	890	730	880	1050	600	410		
014	570	280	300	410	470	280		
015	540	290	350	460	330	420		
016	430	310	220	460	400	310		
TEST DATE	3-2-77	3-8-77	3-14-77	3-23-77	4-5-77	5-6-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 17 OF 188

TEST: Insulation Resistance @ 125°C (Terminal to Terminal)

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	510	350	240	610	400	350		
018	630	330	280	460	630	430		
019	630	330	370	550	420	210		
030	230	210	150	250	250	380		
031	460	180	130	160	370	280		
TEST DATE	3-2-77	3-8-77	3-14-77	4-4-77	4-15-77	5-6-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 18 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR.	C.R.C. P/N M83421/01-1174R
TEST NO. XT 1218-B	ENGR. O.K.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0237G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
.090 uF thru .110uF
After 500 cycles liquid to liquid thermal shock, there are no established % capacitance drift limits for this condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1271
Capacitor decade	G.R. 1413	1274

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.098712	±.095	±.135	±.095	±.125	±.095		
002	.099475	±.1	±.195	±.12	±.19	±.195		
003	.099293	±.015	±.19	±.12	±.115	±.1		
004	.099443	±.075	±.165	±.105	±.105	±.095		
005	.098632	±.015	±.17	±.1	±.09	±.065		
006	.099752	±.015	±.165	±.1	±.135	±.1		
008	.099606	±.085	±.135	±.065	±.055	±.04		
009	.098993	±.085	±.095	±.055	±.065	±.045		
010	.099139	±.1	±.155	±.095	±.165	±.42		
011	.099696	±.01	±.165	±.085	±.13	±.095		
012	.099880	±.095	±.155	±.105	±.13	±.115		
013	.099837	±.04	±.21	±.125	±.16	±.135		
014	.099625	±.16	±.32	±.23	±.295	±.245		
015	.099665	±.045	±.205	±.135	±.16	±.14		
016	.100155	±.025	±.19	±.145	±.16	±.135		
TEST DATE	2-24-77	3-7-77	3-10-77	3-23-77	4-19-77	5-2-77		
TEST BY	C.R.C. Fab.	C.R.C. Fab.	C.R.C. Fab.	C.R.C. Fab.	C.R.C. Fab.	C.R.C. Fab.		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 19 OF 188

TEST: Capacitance Drift @ 25°C with Thermal Shock

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.099942	±.045	±.185	±.105	±.145	±.105		
018	.099998	±.135	±.2	±.185	±.13	±.1		
019	.100029	±.025	±.16	±.115	±.125	±.105		
020	.099631	±.18	±.155	±.09	±.105	±.095		
021	.099916	±.115	±.075	±.095	±.1	±.07		
TEST DATE	3-24-77	4-7-77	3-10-77	3-23-77	4-10-11	5-2-77		
TEST BY	CRC F1	CRC F1	CRC F1	CRC F1	CRC F1	CRC F1		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 20 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR. CRC F2 FIT
TEST NO. XT 1218-B	ENGR. O.K.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
There are no established limits for initial capacitance and % drift @ -55°C

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E485	1588

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.097876	+.045	+.035	+.09	+.155	+.125		
002	.098173	+.05	+.095	+.215	+.24	+.285		
003	.097839	+.055	+.095	+.18	+.23	+.18		
004	.097982	+.065	+.085	+.19	+.24	+.195		
005	.097359	+.095	+.09	+.11	+.12	+.14		
006	.098527	+.055	+.08	+.17	+.2	+.17		
008	.098217	+.04	+.035	+.095	+.135	+.065		
009	.097537	+.045	+.045	+.13	+.195	+.13		
010	.097967	+.04	+.055	+.15	+.15	+.64		
011	.098400	+.025	+.065	+.165	+.15	+.23		
012	.098423	+.065	+.085	+.16	+.23	+.26		
013	.098433	+.095	+.13	+.205	+.27	+.22		
014	.098365	+.085	+.125	+.195	+.23	+.17		
015	.098239	+.115	+.165	+.215	+.25	+.19		
016	.098777	+.12	+.195	+.23	+.27	+.2		
TEST DATE	3-1-77	3-8-77	3-16-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC F2 FIT	CRC F2 FIT	CRC F2 FIT	CRC F2 FIT	CRC F2 FIT	CRC F2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ -55°C with Thermal Shock

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.098585	±.095	±.18	±.195	±.235	±.16		
018	.098546	±.125	±.155	±.18	±.225	±.135		
019	.098650	±.1	±.16	±.185	±.19	±.1		
020	.098198	±.115	±.105	±.205	±.19	±.105		
021	.098559	±.13	±.105	±.26	±.16	±.085		
TEST DATE	3-1-77	3-8-77	3-16-77	4-4-77	4-15-77	5-6-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 22 OF 188

TEST: Capacitance Drift with Thermal Shock

TEST NO. XT 1218-B

TEST TEMP. 125°C

TEST VOLT. N/A

LAB SUPVR. CRC 23 FIT

ENGR. D.K.

Q.A.

C.R.C. P/N M83421/01-1174R

CUST. P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:

Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:

There are no established limits for initial capacitance and % drift @ +125°C

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E485	1588

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.099011	+.02	+.025	+.06	+.05	+.05		
002	.099995	+.015	0.00	+.06	+.045	+.04		
003	.099507	+.02	+.025	+.04	+.035	+.035		
004	.099759	+.035	+.035	+.07	+.06	+.065		
005	.099089	+.015	+.01	+.02	+.015	+.015		
006	.100050	+.015	+.03	+.07	+.06	+.065		
008	.099796	+.015	+.015	+.04	+.03	+.025		
009	.099264	0.00	-.01	+.015	0.00	-.015		
010	.099546	+.015	-.015	+.025	+.035	+.06		
011	.100028	+.03	+.005	+.075	+.085	+.06		
012	.100334	+.01	+.025	+.09	+.055	+.055		
013	.100199	+.01	+.03	+.065	+.05	+.05		
014	.100158	+.01	+.015	+.06	+.05	+.05		
015	.100098	+.015	+.015	+.05	+.04	+.04		
016	.100564	+.015	+.03	+.09	+.05	+.06		
TEST DATE	3-2-77	3-8-77	3-15-77	4-4-77	4-15-77	5-6-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ 125°C with Thermal Shock

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.100378	0.00	+.015	+.035	+.035	+.04		
018	.100394	-.005	+.015	-.005	-.005	-.005		
019	.100563	-.005	-.015	+.025	+.005	+.015		
020	.099967	-.01	-.01	+.03	+.015	+.025		
021	.100130	-.015	-.015	-.015	0.00	+.01		
TEST DATE		3-2-77	3-6-77	3-15-77	4-4-77	4-15-77	5-6-77	
TEST BY		C&C F&J	C&C F&J	C&C F&J	C&C F&J	C&C F&J	C&C F&J	

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O # 704-35622 SHEET 24 OF 188

TEST: Dissipation Factor @ 1 KHz	LAB SUPVR. CRC 23 F/T
TEST NO. XT 1218-B	ENGR. O.K.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
Initial limits - .15%
After 500 cycles liquid to liquid thermal shock there are no established % D.F. limits

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337

ORIGINAL PAGE IS OF POOR QUALITY

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.07	.085	.085	.085	.075	.08		
002	.07	.085	.085	.085	.08	.075		
003	.07	.075	.085	.085	.08	.075		
004	.06	.075	.085	.08	.08	.075		
005	.06	.075	.08	.08	.08	.075		
006	.06	.075	.075	.075	.075	.065		
008	.06	.08	.085	.08	.08	.075		
009	.06	.08	.08	.08	.08	.075		
010	.06	.085	.085	.08	.075	.11		
011	.06	.065	.08	.075	.075	.07		
012	.06	.075	.08	.075	.075	.075		
013	.06	.075	.075	.08	.075	.075		
014	.06	.08	.085	.08	.075	.075		
015	.06	.075	.085	.075	.075	.075		
016	.06	.075	.085	.075	.075	.075		
TEST DATE	2-24-77	3-[illegible]-77	3-10-77	3-23-77	4-19-77	5-2-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 25 OF 188

TEST: Dissipation Factor @ 1KHz @ 25°C

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.06	.08	.085	.085	.075	.075		
018	.07	.08	.08	.08	.08	.075		
019	.06	.075	.08	.075	.075	.075		
020	.06	.085	.085	.08	.08	.075		
021	.06	.085	.08	.095	.08	.075		
TEST DATE	2-24-77	3-7-77	3-10-77	3-23-77	4-19-77	5-2-77		
TEST BY								

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 26 OF 188

TEST: Dissipation Factor @ 1KHz
TEST NO. XT 1218-B
TEST TEMP. -55°C
TEST VOLT. N/A

LAB SUPVR. CRC FIT
ENGR.
Q.A.

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2mins. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337
Temp. test chamber	Statham SDG-1	130
Thermometer	Marshall J E485	1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.36	.35	.39	.35	.35	.34		
002	.35	.34	.39	.36	.34	.34		
003	.36	.35	.35	.35	.35	.35		
004	.36	.34	.35	.35	.34	.34		
005	.36	.35	.36	.36	.35	.35		
006	.34	.33	.34	.34	.33	.33		
008	.36	.35	.38	.36	.36	.35		
009	.36	.34	.35	.36	.34	.34		
010	.36	.35	.35	.35	.35	.38		
011	.34	.33	.33	.34	.33	.4		
012	.35	.34	.44	.35	.34	.36		
013	.35	.34	.36	.39	.34	.36		
014	.36	.34	.35	.35	.34	.36		
015	.36	.34	.35	.35	.34	.35		
016	.36	.34	.35	.35	.34	.36		
TEST DATE	3-7-77	3-8-77	3-16-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ -55°C

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.35	.34	.35	.35	.35	.36		
018	.36	.35	.35	.36	.35	.34		
019	.34	.33	.34	.34	.34	.34		
020	.36	.34	.35	.4	.34	.36		
021	.36	.34	.36	.35	.35	.36		
TEST DATE	3-1-77	3-8-77	3-16-77	4-4-77	4-15-77	5-9-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 28 OF 188

TEST: Dissipation Factor @ 1KHz	LAB SUPVR.
TEST NO. XT 1218-B	ENGR.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337
Temp. test chamber	Statham SDG-1	130
Thermometer	Marshall J E485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.025	.03	.03	.06	.03	.025		
002	.035	.035	.035	.045	.035	.035		
003	.025	.03	.085	.035	.03	.03		
004	.025	.03	.03	.035	.03	.03		
005	.025	.03	.055	.035	.03	.025		
006	.03	.035	.035	.04	.035	.035		
008	.025	.03	.065	.035	.03	.025		
009	.025	.03	.03	.035	.03	.025		
010	.025	.03	.03	.03	.04	.04		
011	.025	.03	.035	.035	.03	.03		
012	.03	.035	.035	.035	.035	.03		
013	.03	.035	.045	.035	.035	.03		
014	.03	.035	.035	.035	.035	.035		
015	.03	.035	.035	.035	.035	.035		
016	.025	.03	.035	.035	.03	.03		
TEST DATE	3-2-77	3-8-77	3-15-77	4-4-77	4-15-77	5-6-77		
TEST BY	CRC F&T	CRC F&T	CRC F&T	CRC F&T	CRC F&T	CRC F&T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ +125°C

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.03	.035	.035	.035	.035	.035		
018	.03	.035	.035	.035	.035	.035		
019	.035	.035	.04	.04	.035	.035		
020	.025	.03	.03	.03	.03	.03		
021	.03	.035	.035	.035	.035	.035		
TEST DATE	3-2-77	3-8-77	3-15-77	4-4-77	4-15-77	5-6-77		
TEST BY	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 30 OF 188

TEST: Dissipation Factor @ 10 KHz	LAB SUPVR. FIT	C.R.C. P/N M83421/01-1174R
TEST NO. XT 1218-B	ENGR. DJL	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0237G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
Initial limits - .15%
After 500 cycles liquid to liquid thermal shock there are no established % D.F. limits.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.18	.185	.185	.215	.195	.205		
002	.18	.19	.185	.225	.215	.215		
003	.18	.18	.195	.22	.215	.2		
004	.18	.185	.195	.225	.215	.21		
005	.17	.165	.185	.215	.21	.2		
006	.18	.18	.185	.22	.21	.195		
008	.18	.18	.185	.215	.195	.195		
009	.17	.175	.175	.21	.2	.195		
010	.18	.185	.185	.215	.2	.195		
011	.18	.155	.18	.205	.19	.185		
012	.17	.195	.205	.215	.195	.2		
013	.17	.165	.175	.21	.205	.215		
014	.19	.19	.205	.23	.215	.21		
015	.17	.18	.21	.215	.2	.185		
016	.16	.155	.175	.195	.19	.22		
TEST DATE	2-24-77	3-7-77	3-11-77	3-23-77	4-19-77	5-2-77		
TEST BY	FIT QAD	FIT QAD	FIT QAD	FIT QAD	FIT QAD	FIT QAD		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 31 OF 188

TEST: Dissipation Factor @ 10 KHz @ 25°C

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.19	.195	.205	.235	.22	.205		
018	.20	.185	.18	.215	.205	.19		
019	.16	.17	.18	.205	.2	.195		
020	.18	.185	.19	.215	.215	.2		
021	.19	.205	.19	.225	.21	.21		
TEST DATE	2-24-77	3-7-77	3-11-77	3-23-77	4-19-77	5-2-77		
TEST BY	Scott	Scott	Scott	Scott	Scott	Scott		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 32 OF 188

TEST: Dissipation Factor @ 10KHz	LAB SUPVR.	C.R.C. P/N M83421/01-1174R
TEST NO. XT 1218-B	ENGR.	CUST. P/N
TEST TEMP. -55°C	Q.A.	PROD. NO. 0237G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIAL NOTES:

Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

SPECIFICATION:

MIL-C-83421, Para. 4.7.9

ACCEPTANCE LIMITS:

There are no established % D.F. limits for this condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.49	.51	.52	.51	.51	.47		
002	.49	.51	.51	.64	.51	.48		
003	.50	.52	.52	.54	.52	.48		
004	.49	.51	.59	.54	.51	.48		
005	.5	.51	.58	.51	.51	.48		
006	.49	.49	.5	.52	.51	.48		
008	.5	.52	.78	.52	.66	.48		
009	.48	.49	.51	.55	.51	.46		
010	.51	.51	.52	.51	.52	.74		
011	.48	.48	.49	.5	.49	.76		
012	.5	.5	.52	.54	.51	.5		
013	.49	.49	.54	.66	.5	.51		
014	.5	.51	.54	.54	.52	.51		
015	.51	.51	.54	.52	.51	.49		
016	.51	.49	.57	.51	.5	.51		
TEST DATE	3-1-77	3-8-77	3-16-77	4-4-77	4-15-77	5-5-77		
TEST BY	Scott Fit	Scott Fit	Scott Fit	Scott Fit	Scott Fit	Scott Fit		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ -55°C

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.5	.52	.54	.52	.52	.52		
018	.5	.51	.53	.54	.51	.49		
019	.48	.5	.51	.54	.51	.5		
020	.5	.51	.54	.52	.51	.51		
021	.5	.52	.52	.56	.64	.51		
TEST DATE	3-1-77	3-8-77	3-16-77	4-4-77	4-15-77	5-6-77		
TEST BY	QRC QA FI	QRC QA FI	QRC QA FI	QRC QA FI	QRC QA FI	QRC QA FI		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615. TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz	LAB SUPVR. CRC 23 F/T	C.R.C. P/N M83421/01-1174R
TEST NO. XT 1218-B	ENGR.	CUST. P/N
TEST TEMP. 125°C	Q.A.	PROD. NO. 0237G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

SPECIFICATION:
MIL-C-83421, Para. 4.7.9

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E485	1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.115	.145	.145	.155	.145	.12		
002	.135	.165	.185	.26	.175	.15		
003	.12	.155	.43	.175	.155	.13		
004	.125	.16	.17	.195	.16	.14		
005	.115	.15	.34	.175	.145	.12		
006	.135	.16	.175	.215	.165	.14		
008	.115	.15	.51	.175	.145	.12		
009	.105	.135	.145	.19	.14	.115		
010	.12	.145	.16	.155	.22	.175		
011	.11	.14	.19	.155	.14	.12		
012	.135	.15	.18	.17	.155	.13		
013	.125	.145	.225	.18	.145	.13		
014	.135	.16	.175	.18	.17	.145		
015	.125	.145	.155	.16	.15	.135		
016	.115	.145	.175	.15	.14	.13		
TEST DATE	3-2-77	3-8-77	3-15-77	4-1-77	4-5-77	5-6-77		
TEST BY	CRC 23 F/T	CRC 23 F/T	CRC 23 F/T	CRC 23 F/T	CRC 23 F/T	CRC 23 F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ 125°C

TEST NO. XT 1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
017	.135	.16	.195	.18	.165	.15		
018	.115	.15	.18	.155	.14	.12		
019	.135	.165	.215	.185	.16	.14		
020	.125	.155	.16	.16	.15	.135		
021	.125	.165	.17	.19	.155	.14		
TEST DATE	3-2-77	3-8-77	3-15-77	4-4-77	4-15-77	5-6-77		
TEST BY								

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 36 OF 188

TEST: E.S.R.	LAB SUPVR. CRC 23 F/T	C.R.C. P/N M83421/01-1174 R
	ENGR. 10.1C.1	CUST. P/N
TEST NO. XT-1218-B	Q.A.	PROD. NO. 0237G
TEST TEMP. 25°C		P/O NO. NAS8-32403
TEST VOLT. N/A		SPECIFICATION:

SPECIAL NOTES:

Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 Cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:

There are no established E.S.R. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
E.S.R. Meter	Clark Hess 273	1130
Cable assembly	Clark Hess 27375	1130

E.S.R. WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial E.S.R. (Ω)	After 50 Cycles (Ω)	After 150 Cycles (Ω)	After 250 Cycles (Ω)	After 350 Cycles (Ω)	After 500 Cycles (Ω)		
001	.14	.17	.16	.16	.16	.16		
002	.17	.19	.19	.18	.20	.19		
003	.16	.17	.19	.16	.17	.17		
004	.17	.19	.18	.18	.18	.18		
005	.15	.16	.16	.15	.16	.15		
006	.17	.18	.18	.18	.19	.18		
008	.15	.17	.16	.15	.16	.15		
009	.15	.17	.16	.16	.15	.15		
010	.16	.17	.17	.17	.17	.16		
011	.14	.17	.16	.16	.15	.14		
012	.15	.17	.17	.17	.16	.16		
013	.15	.16	.16	.16	.16	.16		
014	.18	.19	.19	.19	.19	.19		
015	.16	.17	.17	.17	.18	.17		
016	.15	.20	.16	.15	.16	.14		
TEST DATE	2-25-77	3-7-77	3-11-77	3-24-77	4-19-77	5-2-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: E.S.R. @ 25°C

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174 R

CUST P/N

PROD. NO 0237G

P/O NO. NAS8-32403

S/N	E.S.R. WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial E.S.R. Ω	After 50 Cycles Ω	After 150 Cycles Ω	After 250 Cycles Ω	After 350 Cycles Ω	After 500 Cycles Ω		
017	.18	.19	.19	.19	.20	.19		
018	.16	.18	.16	.16	.17	.17		
019	.16	.18	.18	.17	.17	.17		
020	.16	.17	.16	.16	.18	.16		
021	.17	.19	.18	.17	.17	.17		
TEST DATE	2-25-77	3-7-77	3-11-77	3-24-77	4-19-77	5-2-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O 704-35622 SHEET 38 OF 188

TEST: Seal Test (Fine Leak Test)	LAB SUPVR. CRC 23 F/T
TEST NO. XT-1218-B	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174 R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.5

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 Cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
Leakage not to exceed $1X10^{-6}$ atm/cc/sec.

EQUIPMENT USED:

	Model No.	ECN No.
Fine leak detector	DuPont 24-120B	651

S/N	Initial		After 50 hr		After 150 hr		After 250 hr		After 350 hr		After 500 hr			
	$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$			
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail		
001	✓		✓		✓		✓		✓		✓			
002	↑		↑		↑		↑		↑		↑			
003														
004														
005														
006														
008														
009														
010														
011														
012														
013														
014														
015	↓		↓		↓		↓		↓		↓			
016	✓		✓		✓		✓		✓		✓			
TEST DATE	2-28-71		3-9-71		3-21-71		4-8-71		4-21-71		5-25-71			
TEST BY	CRC 2 F/T		CRC 2 F/T		CRC 2 F/T		CRC 2 F/T		CRC 2 F/T		CRC 2 F/T			

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Seal Test (Fine Leak Test)

TEST NO: XT-1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	Initial $1X10^{-6}$		After 50 hr $1X10^{-6}$		After 150 hr $1X10^{-6}$		After 250 hr $1X10^{-6}$		After 350 hr $1X10^{-6}$		After 500 hr $1X10^{-6}$			
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail		
017	✓		✓		✓		✓		✓		✓			
018	↓		↓		↓		↓		↓		↓			
019	↓		↓		↓		↓		↓		↓			
020	↓		↓		↓		↓		↓		↓			
021	✓		✓		✓		✓		✓		✓			
TEST DATE	2-28-77		3-9-77		3-21-77		4-8-77		4-21-77		5-25-77			
TEST BY	CRC 2 F/T		CRC 2 F/T		CRC 2 F/T		CRC 2 F/T		CRC 2 F/T		CRC 2 F/T			

F-634-2

COMPONENT RESEARCH CO.,INC.

TEST REPORT SUMMARY

Thermal Shock
Liquid to Liquid
500 Cycles, -55°C to +125°C

TEST NO.
Report No. XT-1218-C

PROD. NO. 0238G
CUSTOMER NASA, Marshall Space Flight Center
LOT
CUSTOMER P/N
LOT SIZE 20
CUSTOMER P/O NAS8-32403
C.R.C. P/N M83421/01-1186R
C.R.C. S/O 704-35622
DATE COMPLETED April 9, 1977

TEST	REQUIREMENT	METHOD PARAGRAPH	ACC / REJ
Insulation Resistance	3.11	4.7.7	20 / 0
Capacitance	N/A	4.7.8	20 / 0
Dissipation Factor	3.13	4.7.9	20 / 0
E.S.R.			20 / 0
Seal Test	3.9	4.7.5	19 / 1

QUALITY CONTROL DATE

SHIPPING DATA

ORDER #	DATE SHIPPED	QTY SHIPPED	INVOICE #	QTY STOCKED

N/A

F-634-3

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 41 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. [signature]
TEST NO. XT 1218-C	ENGR. [signature]
TEST TEMP. 25°C	Q.A. [signature]
TEST VOLT. 30VDC	C.R.C. P/N M83421/01-1186 R
	CUST. P/N
	PROD. NO. 0238G
	P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
45pA maximum or 666,000 megohms minimum
After 500 cycles liquid to liquid thermal shock there are no established limits for maximum leakage current @ 25°C.

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	G.R. 425A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter	Simpson 260	1357
Battery pack	N/A	

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	9	8	16	10	44	9		
121	7	9	16	9	10	9		
122	5	8	15	10	17	8		
123	8	7	16	8	8	8		
124	7	8	14	8	32	10		
125	7	8	16	11	20	12		
126	6	10	15	10	140	34		
127	5	7	17	8	9	7		
128	10	7	17	12	90	8		
129	8	7	15	9	9	7		
130	6	6	15	9	9	5		
131	7	9	14	8	7	7		
132	6	12	15	9	9	7		
134	7	7	15	8	15	6		
135	6	7	15	6	13	6		
TEST DATE	2-28-77	3-8-77	3-11-77	3-23-77	4-19-77	4-29-77		
TEST BY	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ 25°C (Terminal to Terminal)

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

TEST NO. XT 1218-C

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	6	15	16	9	17	8		
137	6	20	14	8	15	6		
138	7	24	13	8	7	8		
139	7	13	14	7	13	7		
140	6	19	14	8	17	8		
TEST DATE	2-28-77	3-8-77	3-11-77	3-23-77	4-19-77	4-29-77		
TEST BY	C. Galt Fitt	C. Galt Fitt	C. Galt Fitt	C. Galt Fitt	C. Galt Fitt	C. Galt Fitt		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 43 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR.
TEST NO. XT 1218-C	ENGR.
TEST TEMP. -55°C	Q.A.
TEST VOLT. 30VDC	

C.R.C. P/N M83421/01-1186 R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION:
MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
There are no established limits for maximum leakage current @ -55°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	G.R. 425A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter	Simpson 260	1357
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	15	21	25	26	30	37		
121	13	21	10	26	21	39		
122	10	21	13	29	25	51		
123	11	21	10	20	24	19		
124	13	24	30	24	24	15		
125	11	21	10	20	25	15		
126	10	21	18	40	33	52		
127	14	18	8	18	24	15		
128	11	20	10	20	23	20		
129	10	20	6	19	32	19		
130	10	20	7	21	25	16		
131	11	24	6	23	22	15		
132	14	22	9	26	18	19		
134	12	21	8	21	18	15		
135	10	20	5	19	20	21		
TEST DATE	2-28-77	3-8-77	3-16-77	4-5-77	4-15-77	5-9-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ -55°C (Terminal to Terminal)

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	10	20	7	20	18	18		
137	12	19	9	19	15	11		
138	10	19	6	17	20	17		
139	10	20	13	17	21	17		
140	10	19	14	18	25	16		
TEST DATE	2-28-77	3-8-77	3-16-77	4-5-77	4-15-77	5-9-77		
TEST BY	CRC 2FIT	CRC 2FIT	CRC 2FIT	CRC 2FIT	CRC 2FIT	CRC 2FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 45 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. C&C F&C IIT
TEST NO. XT 1218-C	ENGR.
TEST TEMP. 125°C	Q.A.
TEST VOLT. 18VDC	

C.R.C. P/N M83421/01-1186 R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
2250 pA maximum or 8,000 megohms minimum
After 500 cycles liquid to liquid thermal shock there are no established limits for maximum leakage current @ +125°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	H.P. 425A	1480
I.R. Test rack	C.R.C. None	647
D.C. volt ohm meter	Simpson 260	1357
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	300	390	570	330	330	270		
121	480	360	550	430	330	250		
122	115	470	670	540	600	310		
123	210	160	290	160	210	170		
124	300	170	280	340	210	190		
125	280	310	520	270	280	250		
126	260	170	410	960	1700	2.00		
127	260	380	610	360	310	320		
128	380	190	260	280	180	290		
129	260	350	540	290	370	310		
130	200	290	440	410	230	240		
131	700	105	6.00	580	380	410		
132	300	290	520	400	240	230		
134	600	310	510	430	490	360		
135	260	190	390	160	230	250		
TEST DATE	3-1-77	3-8-77	3-17-77	4-4-77	4-15-77	5-2-77		
TEST BY	C&C F&C IIT	C&C F&C IIT	C&C F&C IIT	C&C F&C IIT	IIT C&C	C&C IIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ 125°C (Terminal to Terminal)

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186 R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	600	180	350	360	210	440		
137	900	350	590	460	310	340		
138	650	270	550	350	530	510		
139	480	400	350	600	850	1100		
140	500	190	100	250	240	260		
TEST DATE	3-1-77	3-8-77	3-10-77	4-6-77	4-15-77	5-9-77		
TEST BY								

F-634-2

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 47 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR.	C.R.C. P/N M83421/01-1186 R
TEST NO. XT 1218-C	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

SPECIFICATION:
MIL-C-83421, Para. 4.7.8

ACCEPTANCE LIMITS:
.135uF to .165uF
After 500 cycles liquid to liquid thermal shock there are no established % capacitance drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.150087	+.1	+.125	+.27	+.3	+.28		
121	.150065	+.105	+.13	+.34	+.37	+.35		
122	.150597	+.095	+.095	+.205	+.23	+.215		
123	.148719	+.085	+.085	+.15	+.195	+.165		
124	.151585	+.085	+.075	+.125	+.175	+.14		
125	.148677	+.015	+.1	+.135	+.17	+.145		
126	.148131	+.1	+.085	+.47	+1.25	+2.15		
127	.150381	+.015	+.1	+.15	+.165	+.155		
126	.148977	+.005	+.085	+.1	+.135	+.13		
129	.151465	+.01	+.065	+.065	+.1	+.09		
130	.148015	+.085	+.075	+.155	+.195	+.165		
131	.153885	+.095	+.09	+.19	+.23	+.2		
132	.149588	+.01	+.085	+.15	+.16	+.15		
134	.150117	+.11	+.09	+.18	+.205	+.16		
135	.149099	+.025	+.085	+.14	+.195	+.14		
TEST DATE	2-28-77	3-7-77	3-11-77	3-28-77	4-19-77	5-2-77		
TEST BY	C.R.C. F.T.	C.R.C. F.T.	C.R.C. F.T.	C.R.C. F.T.	C.R.C. F.T.	C.R.C. F.T.		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ 25°C with Thermal Shock

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186 R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.150674	±.03	±.09	±.155	±.195	±.19		
137	.148509	±.1	±.095	±.155	±.185	±.165		
138	.151082	±.49	±.56	±.58	±.62	±.6		
139	.149832	±.135	±.125	±.105	±.185	±.155		
140	.149618	±.085	±.06	±.015	±.065	±.045		
TEST DATE		2-28-77	3-7-77	3-14-77	3-28-77	4-19-77	5-2-77	
TEST BY		Galt	Galt	Galt	Galt	Galt	Galt	

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 · TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 49 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR. CRC 2 F/T	C.R.C. P/N M83421/01-1186R
TEST NO. XT 1218-C	ENGR. D.K.	CUST. P/N
TEST TEMP. -55°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
There are no established initial capacitance and % capacitance drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.148207	-.035	-.015	+.115	+.28	+.155		
121	.148167	-.025	+.03	+.17	+.32	+.23		
122	.148122	-.025	+.015	+.055	+.21	+.11		
123	.146962	0.00	+.07	+.025	+.19	+.05		
124	.149622	-.015	+.04	-.015	+.17	+.015		
125	.146822	-.005	+.035	-.005	+.175	+.025		
126	.146252	-.015	-.135	+.32	+1.05	+1.3		
127	.148452	+.005	+.125	+.005	+.155	+.045		
128	.147122	0.00	+.1	-.015	+.17	+.035		
129	.149592	-.015	+.1	-.095	+.11	-.025		
130	.146142	-.01	-.045	-.015	+.19	+.055		
131	.151962	-.005	-.045	+.045	+.23	+.09		
132	.147532	-.015	0.00	+.035	+.19	+.045		
134	.148212	-.005	-.03	+.03	+.21	+.08		
135	.147182	-.025	-.03	-.035	+.15	+.005		
TEST DATE	2-28-77	3-8-77	3-16-77	4-5-77	4-15-77	5-9-77		
TEST BY	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ -55°C with Thermal Shock

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186 R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.148672	+.005	+.075	+.04	+.24	+.1		
137	.146632	+.005	+.12	+.005	+.195	+.06		
138	.149902	-.01	+.11	-.055	+.145	+.025		
139	.148012	+.025	+.135	-.125	+.14	+.115		
140	.147582	+.015	+.19	-.145	+.115	-.005		
TEST DATE		2-28-77	3-8-77	3-16-77	4-4-77	4-18-77	5-5-77	
TEST BY		QC FILE COPY	QC FILE COPY	QC FILE COPY	QC FILE COPY	QC FILE COPY	QC FILE COPY	

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA C/O - 704-35622 SHEET 51 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR. C.R.C. F.T.	C.R.C. P/N M83421/01-1186 R
TEST NO. XT 1218-C	ENGR. D.K.	CUST. P/N
TEST TEMP. 125°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIAL NOTES:

Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

SPECIFICATION:

MIL-C-83421, Para. 4.7.8

ACCEPTANCE LIMITS:

There are no established initial capacitance and % capacitance drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.150446	+.035	-.04	+.165	+.155	+.155		
121	.150506	+.035	-.085	+.205	+.19	+.185		
122	.150866	+.025	-.005	+.125	+.105	+.105		
123	.149036	+.015	-.045	+.095	+.09	+.09		
124	.151656	+.015	-.04	+.07	+.07	+.075		
125	.145946	+.015	-.01	+.07	+.07	+.075		
126	.148376	+.01	-.025	+.73	+1.4	+2.4		
127	.150716	+.03	-.05	+.095	+.095	+.105		
128	.149802	+.015	0.00	+.05	+.055	+.065		
129	.151672	+.025	+.01	+.045	+.055	+.07		
130	.148372	+.03	-.035	+.105	+.105	+.11		
131	.154042	+.015	+.055	+.125	+.13	+.125		
132	.149682	+.015	+.095	+.095	+.095	+.095		
134	.150452	+.01	-.05	+.1	+.1	+.105		
135	.149512	+.015	-.11	+.065	+.065	+.065		
TEST DATE	3-1-77	3-8-77	3-10-77	4-4-77	4-15-77	5-9-77		
TEST BY	C.R.C. F.T.	C.R.C. F.T.	C.R.C. F.T.	C.R.C. F.T.	C.R.C. F.T.	C.R.C. F.T.		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 52 OF 188

TEST: Capacitance Drift @ 125°C with Thermal Shock

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186 R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.150952	+.015	-.02	+.055	+.085	+.095		
137	.148872	+.015	-.08	+.07	+.075	+.075		
138	.152142	+.025	-.055	+.07	+.06	+.065		
139	.150282	+.025	-.035	+.075	+.07	+.085		
140	.149782	+.01	+.03	+.035	+.03	+.04		
TEST DATE	3-1-77	3-8-77	3-10-77	3-23-77	4-15-77	5-9-77		
TEST BY	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.		

F-634-2

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA P/O - 704-35622 SHEET 53 OF 188

TEST: Dissipation Factor @ 1 KHz	LAB SUPVR. CRC 2 FIT	C.R.C. P/N M83421/01-1186 R
TEST NO. XT 1218-C	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
15%
After 500 cycles liquid to liquid thermal shock there are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.07	.075	.085	.08	.08	.08		
121	.085	.09	.09	.09	.095	.09		
122	.07	.085	.085	.09	.08	.08		
123	.07	.075	.085	.085	.085	.085		
124	.07	.075	.075	.085	.085	.08		
125	.07	.075	.09	.08	.08	.085		
126	.07	.08	.085	.095	.145	.19		
127	.07	.075	.085	.08	.085	.08		
128	.07	.075	.085	.095	.08	.08		
129	.07	.075	.085	.075	.08	.08		
130	.07	.075	.085	.075	.08	.105		
131	.07	.085	.085	.08	.08	.08		
132	.07	.075	.085	.08	.08	.08		
134	.07	.08	.085	.07	.08	.08		
135	.075	.075	.08	.075	.095	.08		
TEST DATE	2-28-77	3-7-77	3-11-77	3-28-77	4-19-77	5-2-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 54 OF 188

TEST: Dissipation Factor @ 1KHz @ 25°C

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (055°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.07	.08	.085	.085	.08	.085		
137	.07	.075	.085	.075	.075	.075		
138	.07	.065	.08	.075	.08	.075		
139	.075	.075	.08	.075	.075	.08		
140	.075	.08	.085	.075	.08	.075		
TEST DATE	2-28-77	3-7-77	3-14-77	3-28-77	4-19-77	5-2-77		
TEST BY	CRC QA	CRC QA	CRC QA	CRC QA	CRC QA	CRC QA		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA 8000 - 704-35622 SHEET 55 OF 188

TEST: Dissipation Factor @ 1KHz	LAB SUPVR.
TEST NO. XT 1218-C	ENGR.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1186 R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.36	.37	.39	.37	.36	.37		
121	.37	.36	.4	.39	.37	.38		
122	.36	.36	.4	.37	.38	.37		
123	.37	.36	.44	.38	.36	.38		
124	.35	.36	.38	.37	.36	.37		
125	.36	.36	.44	.38	.36	.38		
126	.35	.36	.49	.51	.4	.56		
127	.36	.36	.39	.38	.36	.38		
128	.40	.36	.4	.37	.36	.37		
129	.36	.36	.39	.37	.36	.37		
130	.48	.35	.37	.36	.36	.36		
131	.36	.37	.76	.46	.36	.37		
132	.37	.36	.4	.39	.36	.37		
134	.37	.36	.42	.41	.36	.37		
135	.36	.36	.44	.36	.36	.37		
TEST DATE	2-28-77	3-8-77	3-16-77	4-5-77	4-15-77	5-9-77		
TEST BY								

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ -55°C

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186.R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.37	.36	.39	.38	.37	.38		
137	.35	.36	.37	.37	.36	.36		
138	.37	.36	.4	.38	.36	.37		
139	.42	.41	.44	.44	.41	.44		
140	.37	.39	.39	.38	.36	.37		
TEST DATE	2-28-77	3-8-77	3-16-77	4-4-77	4-15-77	5-9-77		
TEST BY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O 704-35622 SHEET 57 OF 188

TEST: Dissipation Factor @ 1KHz	LAB SUPVR. CRC 23 FIT
TEST NO. XT-1218-C	ENGR. D.K.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1186R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.04	.045	.065	.035	.04	.035		
121	.04	.045	.09	.045	.05	.035		
122	.04	.035	.08	.035	.04	.035		
123	.04	.03	.09	.04	.045	.035		
124	.04	.035	.065	.035	.04	.035		
125	.04	.04	.085	.04	.04	.035		
126	.03	.035	.08	.045	.06	.075		
127	.04	.045	.09	.04	.045	.035		
128	.04	.035	.085	.035	.04	.035		
129	.05	.04	.085	.04	.04	.035		
130	.13	.035	.085	.035	.035	.035		
131	.04	.06	.085	.045	.045	.035		
132	.04	.035	.085	.035	.035	.03		
134	.04	.04	.065	.035	.04	.035		
135	.04	.035	.06	.035	.035	.03		
TEST DATE	3-1-77	3-8-77	3-10-77	4-4-77	4-15-77	5-9-77		
TEST BY	CRC 23 FIT	CRC 23 FIT	CRC 23 FIT	CRC 23 FIT	CRC 23 FIT	CRC 23 FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

ORIGINAL PAGE IS OF POOR QUALITY

Customer's Name: NASA

S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ +125°C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

TEST NO. XT-1218-C

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.04	.045	.085	.04	.045	.035		
137	.04	.035	.08	.035	.035	.03		
138	.04	.04	.085	.04	.04	.035		
139	.04	.04	.085	.04	.04	.035		
140	.04	.07	.085	.04	.045	.035		
TEST DATE	3-1-77	3-8-77	3-10-77	3-23-77	4-1-5-77	5-9-77		
TEST BY	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 59 OF 188

TEST: Dissipation Factor @ 10KHz	LAB SUPVR.	C.R.C. P/N M83421/01-1186R
TEST NO. XT-1218-C	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

SPECIFICATION:
MIL-C-83421, Para. 4.7.9

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK @ 10 KHz (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.17	.165	.18	.175	.185	.18		
121	.19	.24	.25	.23	.23	.22		
122	.14	.165	.165	.165	.17	.165		
123	.17	.195	.215	.22	.225	.225		
124	.15	.165	.19	.185	.2	.19		
125	.165	.185	.215	.195	.2	.205		
126	.145	.165	.17	.16	.18	.195		
127	.17	.175	.2	.195	.205	.2		
128	.155	.17	.19	.18	.195	.205		
129	.15	.165	.185	.17	.18	.18		
130	.16	.18	.19	.19	.20	.19		
131	.165	.195	.2	.185	.20	.205		
132	.16	.17	.185	.175	.16	.185		
134	.155	.175	.185	.16	.19	.18		
135	.18	.155	.165	.165	.17	.17		
TEST DATE	2-28-77	3-7-77	3-11-77	3-28-77	4-19-77	5-2-77		
TEST BY	C.B. F.C.	C.B. F.C.	C.B. F.C.	C.B. F.C.	C.B. F.C.	C.B. F.C.		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10 KHz @ 25°C

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK @ 10 KHz (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.145	.205	.22	.22	.22	.225		
137	.15	.165	.175	.165	.17	.18		
138	.15	.15	.175	.17	.18	.175		
139	.155	.175	.185	.185	.19	.195		
140	.17	.165	.2	.195	.2	.21		
TEST DATE	2-26-71	3-1-71	3-11-71	3-26-71	4-19-71	5-2-71		
TEST BY	CRC F2 F/T	CRC F2 F/T	CRC F2 F/T	CRC F2 F/T	CRC F2 F/T	CRC F2 F/T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 61 OF 188

TEST: Dissipation Factor @ 10KHz

TEST NO. XT 1218-C

TEST TEMP. -55°C

TEST VOLT. N/A

LAB SUPVR. CRC FIT

ENGR. K.O. I.C.

Q.A.

C.R.C. P/N M83421/01-1186R

CUST. P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:

Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:

There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK @ 10 KHz (-55°C to +125°C)

S/N	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.52	.6	.74	.59	.55	.51		
121	.58	.59	.8	.63	.63	.56		
122	.51	.54	.76	.58	.65	.51		
123	.58	.58	.81	.6	.62	.55		
124	.53	.56	.58	.58	.55	.53		
125	.54	.56	.86	.59	.58	.53		
126	.50	.54	.84	.71	.64	.63		
127	.54	.56	.62	.6	.58	.54		
128	.85	.55	.81	.59	.54	.53		
129	.55	.56	.74	.56	.54	.51		
130	.87	.55	.62	.56	.56	.52		
131	.55	.64	1.75	.88	.56	.56		
132	.55	.56	.74	.6	.56	.52		
134	.55	.56	.93	.81	.56	.53		
135	.54	.54	.9	.68	.55	.5		
TEST DATE	2-28-77	3-8-77	3-16-77	4-5-77	4-15-77	5-9-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ -55°C

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK @ 10 KHz (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.58	.59	.67	.6	.59	.55		
137	.53	.54	.6	.61	.54	.5		
138	.55	.56	.82	.56	.55	.51		
139	.58	.6	.8	.7	.6	.56		
140	.55	.8	.8	.59	.58	.54		
TEST DATE	2-28-77	3-8-77	3-16-77	4-5-77	4-15-77	5-9-77		
TEST BY	C&C FIT	C&C FIT	C&C FIT	C&C FIT	C&C FIT	C&C FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 63 OF 188

TEST: Dissipation Factor @ 10KHz	LAB SUPVR. GRC 23 FIT
TEST NO. XT 1218-C	ENGR.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1186R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006 (Liquid to Liquid) 500 cycles -55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK @ 10 KHz (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
118	.15	.22	.18	.175	.195	.135		
121	.23	.29	.24	.23	.31	.165		
122	.18	.175	.16	.16	.21	.125		
123	.21	.225	.22	.22	.245	.16		
124	.17	.195	.185	.165	.215	.145		
125	.17	.21	.2	.205	.225	.155		
126	.15	.175	.16	.19	.3	.21		
127	.18	.215	.2	.205	.215	.16		
128	.23	.195	.19	.195	.205	.15		
129	.24	.195	.18	.185	.2	.145		
130	.65	.2	.21	.2	.21	.15		
131	.22	.42	.195	.21	.19	.16		
132	.20	.19	.185	.19	.195	.135		
134	.20	.205	.18	.185	.195	.14		
135	.18	.185	.195	.195	.185	.125		
TEST DATE	3-1-77	3-8-77	3-10-77	3-23-77	4-5-77	5-9-77		
TEST BY	GRC FIT	GRC FIT	GRC FIT	GRC FIT	GRC FIT	GRC FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ 125°C

TEST NO. XT 1218-C

C.R.C. P/N M83421/01-1186R
CUST P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK @ 10KHz (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
136	.24	.245	.215	.235	.24	.185		
137	.18	.185	.165	.165	.18	.125		
138	.20	.20	.17	.19	.185	.13		
139	.21	.21	.185	.21	.205	.15		
140	.22	.52	.20	.215	.31	.16		
TEST DATE	3-1-77	3-5-77	3-10-77	3-23-77	4-15-77	5-9-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O 704-35622

TEST: E.S.R.	LAB SUPVR. CRC 2 3 F/T	C.R.C. P/N M83421/01-1186 R
TEST NO. XT-1218-C	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIAL NOTES:

Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 Cycles
-55°C to +125°C (2 mins. per cycle)

SPECIFICATION:

ACCEPTANCE LIMITS:

There are no established E.S.R. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
E.S.R. Meter	Clark-Hess 273	1130
Cable Assembly	Clark-Hess 27375	1130

E.S.R. WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial E.S.R. IN Ω	After 50 Cycles IN Ω	After 150 Cycles IN Ω	After 250 Cycles IN Ω	After 350 Cycles IN Ω	After 500 Cycles IN Ω		
118	.11	.12	.11	.11	.11	.11		
121	.16	.19	.19	.16	.18	.20		
122	.10	.10	.10	.10	.10	.09		
123	.13	.18	.16	.16	.16	.15		
124	.10	.12	.15	.12	.12	.11		
125	.13	.13	.13	.13	.14	.13		
126	.10	.10	.10	.10	.10	.09		
127	.12	.14	.14	.13	.13	.13		
128	.11	.13	.13	.13	.13	.13		
129	.13	.13	.12	.12	.12	.11		
130	.11	.13	.13	.13	.13	.13		
131	.12	.13	.13	.13	.13	.13		
132	.11	.11	.11	.11	.11	.11		
134	.11	.14	.12	.12	.12	.11		
135	.13	.11	.12	.11	.11	.10		
TEST DATE	2-26-77	3-7-77	3-10-77	3-24-77	4-19-77	5-2-77		
TEST BY	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street • Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: E.S.R. @ 25°C
TEST NO. XT-1218-C
C.R.C. P/N M83421/01-1186R
CUST P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

S/N	E.S.R. WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial E.S.R. Ω	After 50 Cycles Ω	After 150 Cycles Ω	After 250 Cycles Ω	After 350 Cycles Ω	After 500 Cycles Ω		
136	.14	.16	.16	.16	.16	.16		
137	.10	.10	.11	.10	.11	.10		
138	.10	.11	.13	.10	.11	.10		
139	.11	.13	.13	.13	.13	.13		
140	.12	.13	.14	.14	.14	.14		
TEST DATE	2-28-77	3-7-77	3-10-77	3-24-77	4-11-77	5-2-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA P/O - 704-35622 SHEET 67 OF 188

TEST: Seal Test (Fine Leak Test)	LAB SUPVR. CRC FIT	C.R.C. P/N M83421/01-1186R
TEST NO. XT-1218-C	ENGR. O.K.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.5

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 Cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
Leakage not to exceed $1X10^{-6}$ atm/cc/sec.

EQUIPMENT USED:

	Model No.	ECN No.
Fine leak detector	Du-Pont 24-120B	651

S/N	Initial		After 50 ℵ		After 150 ℵ		After 250 ℵ		After 350 ℵ		After 500 ℵ			
	$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$			
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail		
118	✓		✓		✓		✓		✓		✓			
121	↑		↑		↑		↑		↑		↑			
122	↑		↑		↑		↑		↑		↑			
123	↑		↑		↑		↑		↑		↑			
124	↑		↑		↑		↑		↑		↓			
125	↑		↑		↑		↑		↑		✓			
126	↑		↑		↑		↑		↑			✓		
127	↑		↑		↑		↑		↑		✓			
128	↑		↑		↑		↑		↑		↑			
129	↑		↑		↑		↑		↑		↑			
130	↑		↑		↑		↑		↑		↑			
131	↑		↑		↑		↑		↑		↑			
132	↑		↑		↑		↑		↑		↑			
134	↓		↓		↓		↓		↓		↓			
135	✓		✓		✓		✓		✓		✓			
TEST DATE	2-28-77		3-9-77		3-21-77		4-8-77		4-21-77		5-25-77			
TEST BY	CRC FIT		CRC FIT		CRC FIT		CRC FIT		CRC FIT		CRC FIT			

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Seal Test @ 25°C (Fine Leak Test)

TEST NO.: XT-1218-C

C.R.C. P/N: M83421/01-1186R

CUST P/N:

PROD. NO.: 0238G

P/O NO.: NAS8-32403

S/N	Initial		After 50 hr		After 150 hr		After 250 hr		After 350 hr		After 500 hr			
	$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$			
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail		
136	✓		✓		✓		✓		✓		✓			
137	↕		↕		↕		↕		↕		↕			
138														
139	↕		↕		↕		↕		↕		↕			
140	✓		✓		✓		✓		✓		✓			
TEST DATE	2-28-77		3-9-77		3-21-77		4-8-77		4-21-77		5-85-77			
TEST BY	CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT			

F-634-2

COMPONENT RESEARCH CO.,INC.

TEST REPORT SUMMARY

Thermal Shock
Liquid to Liquid
500 Cycles, -55°C to +125°C

TEST NO.

REPORT NO. XT-1218A

PROD. NO. 0236G
LOT
LOT SIZE 20
C.R.C. P/N M83421/01-1090R
DATE COMPLETED April 5, 1977

CUSTOMER NASA, MARSHALL SPACE FLIGHT CENTER
CUSTOMER P/N
CUSTOMER P/O NAS8-32403
C.R.C. S/O 704-35622

TEST	REQUIREMENT	METHOD PARAGRAPH	ACC / REJ
Insulation Resistance	3.11	4.7.7	20 / 0
Capacitance	N/A	4.7.8	20 / 0
Dissipation Factor	3.13	4.7.9	20 / 0
E.S.R.			20 / 0
Seal Test	3.9	4.75	18 / 2

QUALITY CONTROL DATE

SHIPPING DATA

ORDER #	DATE SHIPPED	QTY SHIPPED	INVOICE #	QTY STOCKED

F-634-3

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA C/O - 704-35622 SHEET 70 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC F.T.
TEST NO. XT 1218-A	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. 30VDC	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated thermal shock per TP-1006
(Liquid to Liquid)
500 cycles -55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
Initial limits: 30 pA maximum or 3,000,000 megohms minimum. After 500 cycles liquid to liquid thermal shock there are no established limits for maximum leakage currents @ 25°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V. Ammeter	H.P. 425A	1480
I.R. Test rack	CRC none	647
D.C. volt ohm meter	Simpson 260	1357
Battery pack	N/A	

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	3	2	3	5	3	2		
002	4	2	3	5	5	4		
003	4	5	3	4	3	2		
004	2	3	3	7	5	2		
005	2	2	2	7	4	3		
006	5	2	4	4	3	5		
007	3	2	3	4	2	4		
008	3	2	4	8	5	3		
009	3	2	3	4	3	2		
010	17	2	3	4	4	3		
011	8	2	2	8	3	3		
012	3	2	2	4	2	2		
013	2	2	3	4	4	2		
014	4	2	4	3	5	2		
015	1	2	3	2	4	4		
TEST DATE	2-24-77	3-8-77	3-10-77	3-25-77	4-16-77	4-29-77		
TEST BY	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 71 OF 188

TEST: Insulation Resistance @ 25°C (Terminal to Terminal)

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	3	2	3	3	3	3		
017	1	2	2	4	4	3		
018	3	2	2	5	3	3		
019	2	2	2	4	3	3		
020	1	2	2	6	5	2		
	CRC FIT							
TEST DATE	2-24-77	3-6-77	3-10-77	3-23-77	4-18-77	4-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 72 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPV. CRC F.T.
TEST NO. XT 1218-A	ENGR. D.K.
TEST TEMP. -55°C	Q.A.
TEST VOLT. 30VDC	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006 (Liquid to Liquid)
-55 to +125°C (2 mins. per cycle) 500 cycles

ACCEPTANCE LIMITS:
There are no established limits for maximum leakage current @ -55°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V. Ammeter	H.P. 425A	1480
I.R. Test rack	CRC none	647
D.C. volt ohm meter	Simpson 260	1357
Temperature test chamber	Statham SD9-1	130
Thermometer	Marshall J E-485	1588
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	9	3	6	7	6	5		
002	7	3	6	6	7	8		
003	7	2	7	7	5	10		
004	5	2	8	5	5	7		
005	6	2	5	5	6	5		
006	10	2	8	7	6	9		
007	6	2	7	8	5	7		
008	9	3	7	7	6	7		
009	3	3	6	6	5	6		
010	5	2	8	6	4	5		
011	5	3	8	6	6	12		
012	4	3	8	4	5	6		
013	4	2	9	4	6	10		
014	5	2	3	5	6	5		
015	5	2	7	4	4	7		
TEST DATE	3-1-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ -55°C (Terminal to Terminal)

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	5	2	9	4	5	10		
017	6	2	9	5	4	10		
018	7	6	8	5	4	10		
019	6	3	7	4	5	12		
020	6	4	10	4	5	5		
TEST DATE	3-1-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC F.I.T.	CRC F.I.T.	CRC F.I.T.	CRC F.I.T.	CRC F.I.T.	CRC F.I.T.		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 74 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC FIT
TEST NO. XT 1218-A	ENGR.
TEST TEMP. 125°C	Q.A.
TEST VOLT. 18VDC	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid)
500 cycles -55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
Initial limits - 1500 pA max or 12,000 megohms minimum. After 500 cycles liquid to liquid thermal shock there are no established limits for maximum current leakage @ +125°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V. Ammeter	H.P. 425A	1480
I.R. Test rack	C.R.C. none	647
D.C. volt ohm meter	Simpson 260	1357
Temp. test chamber	Statham SD9-1	130
Thermometer	Marshall J E-485	1588
Battery pack	N/A	

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	28	22	60	23	25	31		
002	25	25	27	30	32	35		
003	29	22	9	18	20	40		
004	17	15	19	36	47	78		
005	17	13	16	15	18	30		
006	18	11	15	13	15	32		
007	15	14	16	23	11	34		
008	15	15	4	15	35	50		
009	18	16	12	8	17	33		
010	20	16	7	15	19	39		
011	21	15	25	33	22	50		
012	25	10	23	8	16	43		
013	18	8	12	9	21	47		
014	44	33	29	29	21	42		
015	39	31	32	25	33	65		
TEST DATE	2-25-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ 125°C (Terminal to Terminal)

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090 R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	12	15	16	19	25	32		
017	11	7	10	20	13	22		
018	13	16	15	19	14	24		
019	20	25	13	17	24	32		
020	27	25	10	13	22	28		
TEST DATE	2-28-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIX	CRC FIX	CRC FIX	CRC FIX	CRC FIX	CRC FIX		

F-634-2

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 76 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR.	C.R.C. P/N M83421/01-1090 R
TEST NO. XT 1218-A	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0236G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIAL NOTES:

Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) 500 cycles
-55°C to +125°C (2 mins. per cycle)

SPECIFICATION:

- MIL-C-83421, Para. 4.7.8

ACCEPTANCE LIMITS:

Initial limit .0090uF to .0110 uF.
After 500 cycles liquid to liquid thermal shock there are no established % cap. drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.009922	-.035	+.14	+.065	-.025	-.02		
002	.009937	+.06	+.145	+.135	+.71	+1.35		
003	.009993	-.055	+.135	+.01	-.06	-.075		
004	.009978	+.035	+.135	+.025	-.03	-.045		
005	.009910	+.05	+.115	-.005	-.05	-.07		
006	.009839	-.035	+.175	+.065	+.005	-.005		
007	.009988	+.075	+.135	+.05	-.005	-.015		
008	.009856	+.055	+.16	+.045	-.025	-.04		
009	.009917	+.105	+.175	+.065	+.225	+.5		
010	.009898	+.065	+.15	+.04	-.02	-.015		
011	.009989	+.07	+.2	+.05	-.025	-.015		
012	.009804	-.025	+.125	+.03	-.03	-.075		
013	.009908	-.015	+.10	-.005	-.07	-.115		
014	.009917	-.015	+.115	+.015	-.035	-.055		
015	.009968	-.015	+.16	+.04	-.02	-.045		
TEST DATE	2-24-77	3-7-77	3-10-77	3-23-77	4-18-77	5-2-77		
TEST BY								

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ 25°C with Thermal Shock

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090 R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.009831	±.035	±.12	±.025	-.035	-.045		
017	.009911	±.05	±.105	±.025	-.025	-.045		
018	.009846	±.065	±.125	±.015	-.06	-.06		
019	.009694	-.025	±.1	±.015	-.055	-.08		
020	.009854	±.045	±.115	±.005	-.05	-.07		
TEST DATE		2-24-77	3-1-77	3-10-77	3-23-77	4-18-77	5-2-77	
TEST BY		CRC F²I T	CRC F²I T	CRC F²I T	CRC F²I T	CRC F²I T	CRC F²I T	

F-634-2

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 78 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR. CRC F3T
TEST NO. XT 1218-A	ENGR. K.C.K.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid)
-55°C to +125°C (2 mins. per cycle) 500 cycles

ACCEPTANCE LIMITS:
There are no established initial capacitance and % capacitance drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SD9-1	130
Thermometer	Marshall J E-485	1588

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.009748	+.03	+.075	+.045	+.10	+.095		
002	.009762	+.015	+.06	+.075	+.39	+1.45		
003	.009822	+.005	+.025	-.025	+.035	+.005		
004	.009615	+.015	+.055	-.02	+.085	+.065		
005	.009740	+.025	+.045	-.005	+.05	+.025		
006	.009670	0.00	0.00	-.035	+.05	+.02		
007	.009770	+.055	+.10	+.025	+.065	+.045		
008	.009692	+.04	+.11	+.06	+.075	+.07		
009	.009789	+.045	+.15	-.07	+.17	+.58		
010	.009724	+.02	+.155	-.025	+.055	+.065		
011	.009624	+.045	+.08	+.06	+.09	+.13		
012	.009643	-.01	-.015	+.075	-.015	+.025		
013	.009741	-.02	-.035	-.075	-.02	+.015		
014	.009761	+.035	+.015	+.02	+.065	+.055		
015	.009613	+.015	+.02	+.025	+.065	+.10		
TEST DATE		3-1-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77	
TEST BY		CRC F3T	CRC F3T	CRC F3T	CRC F3T	CRC F3T	CRC F3T	

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ -55°C with Thermal Shock

TEST NO. XT- 1218-A

C.R.C. P/N M83421/01-1090 R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.009659	±.055	±.065	±.03	±.095	±.34		
017	.009736	±.045	±.05	-.01	±.055	±.035		
018	.009694	±.055	±.05	±.02	±.05	±.01		
019	.009519	±.06	±.075	-.005	±.06	±.015		
020	.009656	±.055	±.105	0.00	±.10	±.055		
TEST DATE	3-1-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC F&T	CRC F&T	CRC F&T	CRC F&T	CRC F&T	CRC F&T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 80 OF 188

TEST: Capacitance Drift with Thermal Shock

TEST NO. XT 1218-A

TEST TEMP. 125°C

TEST VOLT. N/A

LAB SUPV. CRC F/T

ENGR.

Q.A.

C.R.C. P/N M83421/01-1090R

CUST. P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:

Accelerated Thermal Shock per TP-1006 (Liquid to Liquid)
-55°C to +125°C, 2 mins. per cycle, 500 cycles

ACCEPTANCE LIMITS:

There are no established initial capacitance and % capacitance drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SD9-1	130
Thermometer	Marshall J E-485	1588

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.009968	+.015	-.005	-.005	-.01	+.025		
002	.009966	+.015	+.01	+.79	+1.05	+2.05		
003	.009859	+.015	-.005	-.01	-.005	+.02		
004	.010014	-.01	-.03	-.035	-.035	-.005		
005	.009950	+.015	-.005	-.005	-.005	+.02		
006	.009896	+.005	-.005	-.005	-.005	+.025		
007	.009940	+.005	-.005	-.005	-.015	+.015		
008	.009896	+.005	-.025	-.025	-.03	-.005		
009	.009972	-.005	-.015	0.00	+.19	+.8		
010	.009940	+.025	+.015	+.01	+.015	+.045		
011	.009838	+.005	-.005	+.005	+.005	+.035		
012	.009824	-.035	-.04	-.055	-.075	-.06		
013	.009940	0.00	-.005	-.005	-.015	+.005		
014	.009945	+.005	0.00	+.005	-.005	+.02		
015	.009820	-.02	-.035	-.025	-.05	-.01		
TEST DATE	2-28-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ 125°C with Thermal Shock

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C) Initial Cap. in uF	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.009860	-.035	-.03	-.04	-.065	-.045		
017	.009957	+.015	+.01	+.015	+.01	+.03		
018	.009902	-.015	-.015	-.015	-.035	-.02		
019	.009750	-.015	-.03	-.015	-.04	-.02		
020	.009893	-.005	-.015	-.005	-.015	+.01		
TEST DATE	2-28-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC F&T	CRC F&T	CRC F&T	CRC F&T	CRC F&T	CRC F&T		

F-634-2

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 82 OF 188

TEST: Dissipation Factor @ 1 KHz	LAB SUPVR. CRC F/T
TEST NO. XT 1218-A	ENGR. O.K.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006 (Liquid to Liquid)
-55°C to +125°C (2 mins. per cycle)
500 cycles

ACCEPTANCE LIMITS:
Initial limit - .15%
After 500 cycles liquid to liquid thermal shock there are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1337

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.08	.08	.09	.085	.07	.085		
002	.075	.085	.093	.125	.175	.2		
003	.075	.085	.085	.085	.075	.08		
004	.075	.095	.085	.08	.075	.085		
005	.075	.085	.09	.085	.08	.085		
006	.075	.085	.09	.085	.08	.085		
007	.075	.085	.085	.08	.075	.085		
008	.075	.075	.085	.08	.075	.08		
009	.075	.085	.09	.08	.085	.095		
010	.075	.08	.085	.075	.075	.075		
011	.075	.08	.085	.08	.075	.075		
012	.075	.08	.085	.08	.075	.085		
013	.08	.085	.095	.085	.08	.09		
014	.075	.08	.085	.075	.08	.085		
015	.075	.075	.085	.08	.075	.08		
TEST DATE	2-24-77	3-7-77	3-10-77	3-23-77	4-18-77	5-2-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ 25°C

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.075	.08	.085	.075	.075	.075		
017	.08	.095	.09	.075	.075	.075		
018	.08	.085	.09	.08	.08	.08		
019	.07	.075	.085	.08	.075	.08		
020	.075	.09	.075	.075	.075	.08		
TEST DATE	2-24-77	3-7-77	3-10-77	3-23-77	4-16-77	5-2-77		
TEST BY	CRC F²IT	CRC F²IT	CRC F²IT	CRC F²IT	CRC F²IT	CRC F²IT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz	LAB SUPVR. CRC FIT
TEST NO. XT 1218-A	ENGR.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid)
-55°C to +125°C (2 mins. per cycle)
500 cycles

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R.1615	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SD -1	130
Thermometer	Marshall J E-485	1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.4	.38	.38	.4	.39	.39		
002	.4	.38	.38	.5	.44	.61		
003	.39	.38	.37	.39	.37	.38		
004	.39	.37	.37	.39	.38	.38		
005	.39	.38	.38	.39	.38	.39		
006	.4	.39	.38	.4	.39	.39		
007	.39	.38	.37	.39	.41	.38		
008	.39	.38	.37	.39	.38	.39		
009	.39	.38	.37	.41	.41	.61		
010	.39	.39	.37	.39	.38	.39		
011	.39	.38	.38	.45	.38	.39		
012	.39	.38	.38	.4	.45	.39		
013	.39	.38	.38	.4	.38	.38		
014	.39	.38	.38	.39	.38	.39		
015	.4	.38	.38	.4	.38	.39		
TEST DATE	3-1-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ -55°C

C.R.C. P/N M83421/01-1090 R

CUST P/N

PROD. NO. 0236G

TEST NO. XT-1218-A

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.39	.37	.38	.39	.37	.38		
017	.39	.37	.37	.39	.37	.38		
018	.4	.38	.38	.4	.39	.39		
019	.39	.37	.37	.41	.37	.38		
020	.39	.37	.36	.39	.37	.38		
TEST DATE	3-1-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.	CRC F.T.		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 86 OF 188

TEST: Dissipation Factor @ 1KHz

TEST NO. XT 1218-A

TEST TEMP. 125°C

TEST VOLT. N/A

LAB SUPVR. 23 FEB 77

ENGR.

Q.A.

C.R.C. P/N M83421/01-1090R

CUST. P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid)
-55°C to +125°C (2 mins. per cycle)
500 cycles

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1615	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SD -1	130
Thermometer	Marshall J E-485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.015	.015	.015	.015	.015	.02		
002	.015	.02	.02	.035	.035	.045		
003	.015	.015	.015	.015	.02	.02		
004	.015	.015	.015	.015	.015	.02		
005	.015	.015	.015	.015	.015	.02		
006	.015	.015	.015	.02	.015	.02		
007	.015	.015	.015	.015	.015	.015		
008	.015	.015	.015	.015	.015	.015		
009	.01	.015	.015	.015	.015	.025		
010	.015	.015	.015	.015	.015	.015		
011	.015	.015	.015	.015	.015	.015		
012	.015	.015	.015	.015	.02	.015		
013	.015	.02	.02	.02	.02	.025		
014	.015	.015	.015	.02	.015	.02		
015	.015	.02	.02	.02	.02	.02		
TEST DATE	2-28-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ +125°C

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.015	.015	.015	.015	.015	.02		
017	.015	.015	.015	.015	.015	.02		
018	.015	.015	.015	.02	.015	.02		
019	.015	.015	.015	.02	.015	.02		
020	.015	.015	.015	.015	.015	.015		
TEST DATE	2-28-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC F2T	CRC F2T	CRC F2T	CRC F2T	CRC F2T	CRC F2T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 88 OF 188

TEST: Dissipation Factor @ 10 KHz	LAB SUPVR.
TEST NO. XT 1218- A	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090 R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid)
-55°C to +125°C (2 mins. per cycle)
500 cycles

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1615	1331
Precision decade capacitor	G.R. 1413	1337

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.175	.18	.19	.185	.18	.195		
002	.17	.205	.205	.185	.21	.22		
003	.17	.165	.18	.175	.175	.185		
004	.17	.19	.185	.175	.17	.185		
005	.17	.2	.19	.185	.175	.195		
006	.18	.19	.205	.195	.195	.205		
007	.165	.19	.18	.165	.165	.175		
008	.175	.18	.195	.185	.18	.185		
009	.165	.18	.185	.175	.175	.195		
010	.165	.175	.175	.165	.165	.19		
011	.16	.17	.185	.17	.17	.165		
012	.17	.185	.185	.175	.17	.19		
013	.195	.215	.235	.225	.22	.23		
014	.175	.18	.19	.18	.165	.205		
015	.16	.16	.175	.165	.165	.175		
TEST DATE	2-24-77	3-8-77	3-10-77	3-23-77	4-16-77	5-2-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10 KHz @ 25°C

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.16	.175	.18	.165	.165	.175		
017	.175	.195	.19	.17	.165	.175		
018	.18	.195	.20	.185	.19	.19		
019	.17	.195	.19	.185	.18	.185		
020	.165	.195	.17	.165	.175	.18		
TEST DATE	2-22-77	3-8-77	3-10-77	3-23-77	4-7-77	5-2-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 90 OF 188

TEST: Dissipation Factor @ 10 KHz	LAB SUPVR. CRC 23 FIT
TEST NO. XT 1218-A	ENGR. L.K.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid)
-55°C to +125°C (2 mins. per cycle)
500 cycles

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1615	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SD -1	130
Thermometer	Marshall J E-485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.5	.48	.48	.49	.49	.48		
002	.5	.49	.48	.53	.5	.65		
003	.48	.48	.48	.48	.48	.45		
004	.48	.47	.47	.48	.48	.46		
005	.48	.48	.49	.49	.49	.46		
006	.5	.49	.49	.5	.49	.46		
007	.48	.47	.47	.49	.55	.46		
008	.49	.49	.51	.49	.48	.46		
009	.48	.47	.48	.47	.49	.61		
010	.5	.49	.48	.48	.47	.46		
011	.48	.48	.47	.63	.47	.45		
012	.49	.49	.49	.5	.54	.51		
013	.52	.5	.51	.57	.51	.47		
014	.49	.48	.48	.51	.49	.45		
015	.51	.5	.48	.5	.48	.45		
TEST DATE	3-1-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street • Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ -55°C

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R
CUST P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.48	.47	.49	.48	.48	.45		
017	.48	.47	.49	.48	.47	.46		
018	.5	.49	.5	.5	.5	.5		
019	.5	.48	.48	.53	.48	.46		
020	.49	.47	.47	.48	.48	.48		
TEST DATE	3-1-77	3-6-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO.,INC.

1655 · 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10 KHz	LAB SUPVR. C.R.C. 2-3 FIT
TEST NO. XT 1218-A	ENGR.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Accelerated Thermal Shock per TP-1006
(Liquid to Liquid) -55°C to +125°C
(2 mins per cycle) 500 cycles

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1615	1331
Precision decade capacitor	G.R. 1413	1337
Temperature test chamber	Statham SD -1	130
Thermometer	Marshall J E-485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
001	.045	.06	.06	.065	.065	.075		
002	.05	.055	.065	.115	.13	.165		
003	.045	.055	.055	.06	.065	.07		
004	.04	.05	.055	.055	.055	.065		
005	.045	.055	.06	.065	.065	.08		
006	.06	.07	.075	.08	.08	.09		
007	.05	.045	.05	.05	.055	.05		
008	.045	.065	.065	.065	.07	.075		
009	.045	.05	.05	.055	.06	.08		
010	.035	.045	.045	.05	.05	.055		
011	.035	.05	.055	.065	.055	.06		
012	.045	.055	.06	.065	.09	.065		
013	.075	.095	.095	.105	.11	.115		
014	.05	.065	.065	.075	.07	.08		
015	.04	.065	.055	.06	.055	.065		
TEST DATE	2-28-77	3-8-77	3-14-77	4-4-77	4-15-77	5-5-77		
TEST BY	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ 125°C

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 50 Cycles	After 150 Cycles	After 250 Cycles	After 350 Cycles	After 500 Cycles		
016	.045	.055	.055	.055	.055	.065		
017	.04	.055	.065	.055	.055	.065		
018	.055	.065	.065	.075	.075	.075		
019	.045	.06	.06	.065	.065	.065		
020	.045	.055	.055	.06	.06	.06		
TEST DATE	2-28-77	3-8-77	3-14-77	4-4-77	4-13-77	5-5-77		
TEST BY	CRC F1T	CRC F1T	CRC F1T	CRC F1T	CRC F1T	CRC F1T		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 94 OF 188

TEST: E.S.R.	LAB SUPVR. 23 F/T	C.R.C. P/N M83421/01-1090 R
TEST NO. XT-1218-A	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0236G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIAL NOTES:
Accelerated Thermal Shock per TP- 1006
(Liquid to Liquid) 500 Cycles
-55°C to 125°C (2 mins. per cycle)

SPECIFICATION:

ACCEPTANCE LIMITS:
There are no established E.S.R. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN. No.
E.S.R. Meter	273	1130
Cable assembly	27375	1130

S/N	E.S.R. WITH THERMAL SHOCK (-55°C TO +125°C) Initial E.S.R. (Ω)	After 50 Cycles (Ω)	After 150 Cycles (Ω)	After 250 Cycles (Ω)	After 350 Cycles (Ω)	After 500 Cycles (Ω)		
001	1.1	1.0	1.2	1.2	1.2	1.1		
002	1.1	1.0	1.3	1.2	1.3	1.2		
003	1.0	1.0	1.2	1.1	1.1	1.1		
004	1.0	1.0	1.1	1.0	1.0	1.0		
005	1.1	1.0	1.2	1.2	1.2	1.2		
006	1.2	1.0	1.4	1.4	1.4	1.4		
007	.9	1.0	1.0	.9	1.0	.9		
008	1.1	1.0	1.3	1.3	1.3	1.2		
009	1.0	1.0	1.1	1.1	1.1	1.0		
010	1.0	1.0	1.0	1.0	1.0	1.0		
011	.9	1.0	1.0	1.0	1.0	1.1		
013	1.1	1.0	1.2	1.2	1.2	1.2		
013	1.5	1.0	1.8	1.8	1.8	1.9		
014	1.2	1.0	1.3	1.3	1.3	1.3		
015	.9	1.0	1.0	1.0	1.0	1.1		
TEST DATE	2-25-77	3-7-77	3-11-77	3-24-77	4-16-77	5-2-77		
TEST BY	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-1

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: E.S.R. @ 25°C

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090 R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

E.S.R. WITH THERMAL SHOCK (-55°C TO +125°C)

S/N	Initial E.S.R. mΩ	After 50 Cycles mΩ	After 150 Cycles mΩ	After 250 Cycles mΩ	After 350 Cycles mΩ	After 500 Cycles mΩ		
016	1.0	1.0	1.1	1.1	1.1	1.0		
017	1.0	1.0	1.1	1.1	1.1	1.1		
018	1.2	1.0	1.3	1.4	1.4	1.4		
019	1.1	1.0	1.2	1.3	1.3	1.3		
020	1.1	1.0	1.2	1.2	1.1	1.2		
TEST DATE	2-25-77	3-7-77	3-11-77	3-24-77	4-18-77	5-2-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Seal Test (Fine Leak Test)

TEST NO. XT1218-A

TEST TEMP. 25°C

TEST VOLT. N/A

LAB SUPVR. 23 FIT

ENGR.

Q.A.

C.R.C. P/N M83421/01-1090 R

CUST. P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.5

SPECIAL NOTES:
Accelerated Termal Shock per TP-1006
(Liquid to Liquid) 500 Cycles
-55°C to +125°C (2 mins. per cycle)

ACCEPTANCE LIMITS:
Leakage not to exceed $1X10^{-6}$ atm/cc/sec.

EQUIPMENT USED:

	Model No.	ECN No.
Fine leak detector	Du Pont 24-120B	651

S/N	Initial		After 50 Cycles		After 150 Cycles		After 250 Cycles		After 350 Cycles		After 500 Cycles	
	$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$	
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
001	✓		✓		✓		✓		✓		✓	
002	✓		✓		✓		✓		✓			✓
003	✓		✓		✓		✓		✓		✓	
004	✓		✓		✓		✓		✓		✓	
005	✓		✓		✓		✓		✓		✓	
006	✓		✓		✓		✓		✓		✓	
007	✓		✓		✓		✓		✓		✓	
008	✓		✓		✓		✓		✓		✓	
009	✓		✓		✓		✓		✓			✓
010	✓		✓		✓		✓		✓		✓	
011	✓		✓		✓		✓		✓		✓	
012	✓		✓		✓		✓		✓		✓	
013	✓		✓		✓		✓		✓		✓	
014	✓		✓		✓		✓		✓		✓	
015	✓		✓		✓		✓		✓		✓	
TEST DATE	2-28-77		3-9-77		3-21-77		4-6-77		4-21-77		5-25-77	
TEST BY	CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT	

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Seal Test (Fine Leak Test)

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090 R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	Initial $1X10^{-6}$		After 50 hr $1X10^{-6}$		After 150 hr $1X10^{-6}$		After 250 hr $1X10^{-6}$		After 350 hr $1X10^{-6}$		After 500 hr $1X10^{-6}$		
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	
016	✓		✓		✓		✓		✓		✓		
017	↕		↕		↕		↕		↕		↕		
018													
019	↕		↕		↕		↕		↕		↕		
020	✓		✓		✓		✓		✓		✓		
TEST DATE	2-26-77		3-9-77		3-21-77		4-8-77		4-21-77		5-25-77		
TEST BY	CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

TEST REPORT SUMMARY

THERMAL SHOCK
AIR TO AIR
500 CYCLES, -55°C to +125°C

TEST NO.
REPORT #XT-1218-B

PROD. NO. 0237G
LOT
LOT SIZE 30
C.R.C. P/N M83421/01-1174R
DATE COMPLETED July 1, 1977

CUSTOMER NASA, MARSHALL SPACE FLIGHT CENTER
CUSTOMER P/N
CUSTOMER P/O NAS8-32403
C.R.C. S/O 704-35622

TEST	REQUIREMENT	METHOD PARAGRAPH	ACC / REJ
Insulation Resistance	3.11	4.7.7	30 / 0
Capacitance	N/A	4.7.8	30 / 0
Dissipation Factor	3.13	4.7.9	30 / 0
E.S.R.			30 / 0
Seal Test	3.9	4.7.5	27 / 3

QUALITY CONTROL DATE

SHIPPING DATA

ORDER #	DATE SHIPPED	QTY SHIPPED	INVOICE #	QTY STOCKED

F-634-3

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 99 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 23 FIT
TEST NO. XT-1218-B	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. 30 VDC	

C.R.C. P/N M83421/01-1174 R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES: Normal Thermal Shock (Air to Air) per TP-1006, 500 Cycles -55°C to +125°C (1 hr. per cycle)

ACCEPTANCE LIMITS: 30pA maximum or 3,000,000 megohms minimum After 500 thermal shock cycles there are no established limits for maximum leakage current @ 25°C.

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V. ammeter -	H.P. 425A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter -	Simpson 260	1357
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	2	10	5	6	5	7		
023	20	7	5	8	5	6		
024	4	4	5	8	4	6		
025	4	4	5	11	6	7		
026	2	4	4	6	6	11		
027	12	8	3	8	5	7		
028	2	5	5	6	4	7		
029	2	4	5	8	5	6		
030	16	3	5	7	9	10		
032	4	6	5	7	4	4		
033	2	5	4	7	4	5		
034	8	3	3	4	4	6		
035	2	5	6	3	7	7		
036	4	5	4	6	5	5		
037	2	3	5	9	4	5		
TEST DATE	2-24-77	3-11-77	5-4-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 100 OF 188

TEST: Insulation Resistance @ 25°C (Terminal to Terminal)

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	18	3	4	7	4	4		
039	6	12	8	8	7	12		
040	3	4	4	9	4	8		
041	4	5	5	4	7	31		
042	10	3	6	5	4	7		
043	2	6	7	6	3	6		
044	2	4	5	6	4	2		
045	2	3	6	8	5	3		
046	4	10	9	8	7	4		
047	2	4	6	8	4	2		
048	4	3	6	8	3	3		
049	2	5	6	6	4	2		
050	4	5	6	8	4	4		
051	6	5	5	9	5	4		
052	2	4	4	9	2	4		
TEST DATE	2-24-77	3-11-77	5-4-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 101 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 23 FIT	C.R.C. P/N M83421/01-1174 R
TEST NO. XT-1218-B	ENGR.	CUST. P/N
TEST TEMP. -55°C	Q.A.	PROD. NO. 0237G
TEST VOLT. 30 VDC		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established limits for maximum leakage current @-55°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V. Ammeter -	H.P. 425 A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter -	Simpson 260	1357
Temperature test - chamber	Statham SD9-1	130
Thermometer -	Marshall J E-485	1588
Battery pack	N/A	

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	36	15	20	25	21	25		
023	25	15	20	25	35	75		
024	24	14	20	21	27	25		
025	20	13	28	25	20	24		
026	22	17	21	20	25	23		
027	20	16	21	16	18	45		
028	27	15	21	21	18	25		
029	28	15	21	25	21	25		
030	28	10	34	20	43	33		
032	25	12	33	35	50	40		
033	26	37	21	28	22	25		
034	20	31	21	22	24	28		
035	21	10	23	23	25	40		
036	24	13	24	19	17	20		
037	26	17	19	30	24	27		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ -55°C (Terminal to Terminal)

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174 R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	20	14	21	30	33	40		
039	22	16	17	22	33	40		
040	20	16	18	26	52	23		
041	21	15	23	23	32	22		
042	23	12	15	55	23	24		
043	20	16	22	24	26	19		
044	20	9	24	11	20	35		
045	28	15	24	12	13	42		
046	27	11	24	23	13	35		
047	28	10	21	21	33	55		
048	24	11	35	41	15	50		
049	27	12	34	26	13	30		
050	25	14	30	22	27	50		
051	24	10	33	38	16	30		
052	27	21	29	35	33	50		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O 704-35622 SHEET 103 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 2 FIT	C.R.C. P/N M83421/01-1174R
TEST NO. XT-1218-B	ENGR. N.K.	CUST. P/N
TEST TEMP. 125°C	Q.A.	PROD. NO. 0237G
TEST VOLT. 18 VDC		P/O NO. NAS8-32403

SPECIAL NOTES:

Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to 125°C, 1 hr. per cycle

SPECIFICATION:

MIL-C-83421, Para. 4.7.7

ACCEPTANCE LIMITS:

1500 pA maximum or 12,000 megohms minimum. After 500 cycles air to air thermal shock there are no established limits for maximum leakage current @ +125°C.

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter -	H.P. 425A	1480
I.R. test rack	CRC None	647
D.C. volt ohm meter -	Simpson 260	1357
Temperature test chamber	Statham SD9-1	130
Thermometer -	Marshall J E-485	1588
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	240	170	180	330	150	245		
023	420	330	570	550	900	270		
024	150	130	230	1050	11,500	10,000		
025	440	260	250	140	670	280		
026	210	150	190	150	460	250		
027	430	180	190	350	490	200		
028	320	320	235	210	290	140		
029	440	100	370	320	560	300		
030	350	130	390	250	730	300		
032	350	140	180	410	240	210		
033	240	200	410	560	92	400		
034	400	270	420	350	730	580		
035	570	230	370	390	400	270		
036	420	300	270	320	470	300		
037	250	230	310	420	520	95		
TEST DATE	3-2-77	3-14-77	5-6-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ 125°C (Terminal to Terminal)
TEST NO. XT-1218-B
C.R.C. P/N M83421/01-1174 R
CUST P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	250	150	230	530	260	200		
039	250	160	340	440	470	300		
040	530	110	330	1300	410	370		
041	440	150	1500	450	4400	780		
042	960	680	230	2750	310	350		
043	740	130	1750	490	450	650		
044	170	280	420	360	330	265		
045	300	380	460	620	350	215		
046	700	120	480	310	420	280		
047	410	150	390	200	390	115		
048	180	120	185	250	270	120		
049	970	120	265	400	350	195		
050	380	69	520	560	400	140		
051	600	230	490	585	580	590		
052	120	129	540	290	540	330		
TEST DATE	3-2-77	3-14-77	5-6-77	5-31-77	6-17-77	6-28-77		
TEST BY	CRC F-2 F.T.	CRC F-2 F.T.	CRC F-2 F.T.	CRC F-2 F.T.	CRC F-2 F.T.	CRC F-2 F.T.		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

ORIGINAL PAGE IS OF POOR QUALITY

Customer's Name: NASA S/O - 704-35622 SHEET 105 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR. CRC 2 FIT	C.R.C. P/N M83421/01-1174 R
TEST NO. XT-1218-B	ENGR. D.K.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0237G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
.135uF to .165uF
After 500 cycles air to air thermal shock there are no established % capacitance drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator -	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. In uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.099916	+.025	+.025	+.115	+.195	+.22		
023	.099587	+.055	+.08	+.145	+.085	+.21		
024	.100275	+.055	+.065	+.095	+.19	+.085		
025	.100015	+.025	+.025	+.105	+.135	+.145		
026	.099946	+.05	+.055	+.125	+.14	+.165		
027	.100468	+1.0	+1.0	+1.05	+1.1	+1.2		
028	.100138	+.045	+.015	+.020	+.085	+.015		
029	.100589	+.045	+.065	+.165	+.275	+.34		
030	.100225	+.05	+.06	+.25	+.36	+.45		
032	.099683	+.04	+.055	+.185	+.275	+.3		
033	.099973	+.035	+.045	+.155	+.16	+.195		
034	.101235	+.055	+.095	+.215	+.28	+.32		
035	.099490	+.045	+.045	+.155	+.205	+.19		
036	.100181	+.06	+.075	+.165	+.185	+.19		
037	.099406	+.055	+.045	+.095	+.08	+.08		
TEST DATE	2-24-77	3-11-77	5-3-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift with Thermal Shock @ 25°C

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. In UF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.099178	+.185	+.095	+.135	-.125	-.48		
039	.097960	+.225	+.185	+.235	-.1	-.175		
040	.097518	+.245	+.125	+.15	+.145	+.085		
041	.101335	+.125	+.195	+.02	+8.4	+6.3		
042	.098381	+.115	+.155	+.155	+.21	+.22		
043	.097807	+.125	+.21	+.26	+.35	+.8		
044	.097164	+.115	+.1	+.1	+.16	+.115		
045	.097401	+.105	+.105	+.09	+.14	+.09		
046	.099387	+.17	+.205	+.33	+.44	+.4		
047	.097971	+.19	+.06	+.095	+.44	-.02		
048	.098476	+.26	+.12	+.175	+.195	-.21		
049	.098758	+.285	+.09	+.105	+.12	+.135		
050	.097840	+.125	+.05	+.035	+.21	-.085		
051	.097999	+.175	+.05	+.14	+.21	+.205		
052	.098509	+.145	+.045	+.125	+.26	+.19		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-17-77	6-27-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift with Thermal Shock
TEST NO. XT-1218-B
TEST TEMP. -55°C
TEST VOLT. N/A

LAB SUPVR. CRC F/T
ENGR. D.K.
Q.A.

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Normal Thermal Shock per TP-1006 (Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established initial cap. & % cap. drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator -	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temp. test chamber -	Statham SD9-1	130
Thermometer -	Marshall J E-485	1580

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. In uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.098860	±.085	±.06	±.23	±.28	±.28		
023	.098900	±.135	±.135	±.24	±.23	±.18		
024	.098593	±.105	±.105	±.16	±.12	±.085		
025	.098628	±.055	±.055	±.2	±.225	±.18		
026	.096495	±.13	±.105	±.2	±.24	±.22		
027	.100051	±.055	±.065	±.195	±.24	±.165		
028	.098675	±.115	±.06	±.12	±.125	±.045		
029	.099216	±.155	±.16	±.3	±.34	±.4		
030	.096634	±.11	±.085	±.165	±.135	0.00		
032	.098819	±.045	±.025	±.025	±.095	±.18		
033	.098564	±.095	±.145	±.245	±.295	±.29		
034	.099898	±.135	±.19	±.31	±.36	±.34		
035	.098159	±.085	±.11	±.225	±.31	±.28		
036	.098834	±.125	±.17	±.26	±.26	±.2		
037	.098017	±.155	±.14	±.17	±.135	±.07		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-17-77	6-29-77		
TEST BY	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ -55°C with Thermal Shock

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174 R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. In uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.100939	-.005	-.05	-.04	+.045	-.15		
039	.099714	-.01	-.035	+.005	+.07	-.06		
040	.099272	-.045	-.07	-.055	-.05	-.135		
041	.103088	-.03	+.23	+.51	+6.5	+5.5		
042	.100070	-.09	-.045	+.025	+.09	+.025		
043	.099659	+.015	-.03	+.025	+.03	-.06		
044	.096795	-.065	-.04	-.015	-.025	-.08		
045	.099127	-.015	-.05	-.045	-.055	-.125		
046	.100998	+.005	+.015	+.07	+.065	+.055		
047	.099516	0.00	-.02	+.31	+.45	+.015		
048	.100223	-.005	-.015	+.01	+.015	-.005		
049	.100321	-.015	-.02	-.015	-.03	-.105		
050	.099493	-.04	-.045	+.21	+.17	-.065		
051	.099565	-.04	+.005	+.025	+.01	-.06		
052	.100169	-.135	+.015	+.11	+.075	+.05		
TEST DATE	3-2-77	3-15-77	5-5-77	5-31-77	6-16-77	6-26-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR. CRC² FIT	C.R.C. P/N M83421/01-1174 R
TEST NO. XT-1218-B	ENGR.	CUST. P/N
TEST TEMP. 125°C	Q.A.	PROD. NO. 0237G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established initial cap. & % cap. drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator -	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temp. test chamber -	Statham SD9-1	130
Thermometer -	Marshall J E-485	1588

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. In uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.099915	+.005	-.005	+.01	+.075	+.035		
023	.100670	-.01	-.005	+.02	+.075	-.02		
024	.100262	+.01	-.01	-.01	-.015	-.11		
025	.100317	-.005	-.01	.00	+.02	-.065		
026	.100174	+.005	-.03	-.015	+.025	-.04		
027	.101814	-.005	-.015	+.005	+.065	-.01		
028	.100367	-.035	-.06	-.065	-.08	-.18		
029	.100965	-.065	+.01	+.095	+.165	+.105		
030	.100717	-.09	.00	+.37	+.37	+.115		
032	.099809	+.005	+.005	+.31	+.4	-.025		
033	.100261	+.01	-.035	.00	+.015	-.085		
034	.101567	+.015	-.005	+.08	+.16	+.095		
035	.099971	+.01	-.03	+.045	+.04	+.025		
036	.100487	-.01	-.045	.00	+.015	-.09		
037	.099580	-.005	-.025	+.01	+.015	-.07		
TEST DATE	3-2-77	3-15-77	5-6-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC² FIT	CRC² FIT	CRC² FIT	CRC² FIT	CRC² FIT	CRC² FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ +125°C with Thermal Shock

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. In uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.100673	±.05	±.045	±.095	±.075	±.105		
039	.099475	±.065	±.06	±.135	±.15	±.195		
040	.099021	±.065	±.035	±.08	±.055	±.045		
041	.102847	±.04	±.195	±.33	±2.2	±5.9		
042	.099780	±.045	±.015	±.085	±.11	±.125		
043	.099227	±.05	±.055	±.155	±.195	±.225		
044	.098589	±.055	±.03	±.08	±.065	±.095		
045	.098850	±.055	±.05	±.095	±.065	±.065		
046	.100692	±.055	±.085	±.235	±.3	±.34		
047	.099388	±.055	±.03	±.16	±.235	±.3		
048	.099847	±.045	±.045	±.105	±.085	±.195		
049	.100132	±.03	±.015	±.05	±.065	±.06		
050	.099288	±.05	±.04	±.16	±.165	±.26		
051	.099356	±.03	±.025	±.085	±.105	±.12		
052	.099860	±.025	±.025	±.17	±.195	±.265		
TEST DATE	2/8/77	3/4/77	5/5/77	5/29/77	6/14/77	6/29/77		
TEST BY	P/T CRC	P/T CRC	P/T CRC	P/T CRC	P/T CRC	P/T CRC		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 111 OF 188

TEST: Dissipation Factor @ 1KHz	LAB SUPV. CRC FIT
TEST NO. XT-1218-B	ENGR. D.K.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174 R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
After 500 cycles air to air thermal shock there are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator -	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.06	.075	.075	.085	.075	.075		
023	.06	.075	.075	.075	.08	.075		
024	.06	.08	.075	.085	.08	.075		
025	.06	.075	.075	.08	.085	.08		
026	.06	.075	.075	.08	.08	.08		
027	.06	.085	.075	.08	.085	.075		
028	.07	.085	.075	.09	.095	.095		
029	.06	.08	.075	.075	.08	.08		
030	.08	.075	.075	.08	.08	.075		
032	.09	.08	.075	.07	.095	.075		
033	.09	.075	.075	.075	.08	.08		
034	.08	.075	.065	.075	.08	.075		
035	.08	.07	.065	.075	.075	.065		
036	.09	.075	.07	.075	.085	.075		
037	.08	.075	.075	.085	.085	.08		
TEST DATE	2-24-77	3-11-77	5-5-77	5-27-77	6-14-77	6-20-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ 25°C
TEST NO. XT-1218-B
C.R.C. P/N M83421/01-1174R
CUST P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.09	.08	.075	.08	.085	.075		
039	.08	.075	.07	.08	.085	.075		
040	.09	.08	.075	.08	.085	.08		
041	.09	.075	.07	.07	.08	.075		
042	.08	.075	.07	.07	.075	.075		
043	.08	.075	.065	.065	.075	.075		
044	.09	.075	.075	.075	.085	.08		
045	.09	.075	.075	.075	.085	.085		
046	.09	.075	.075	.075	.085	.085		
047	.09	.075	.075	.075	.095	.075		
048	.09	.075	.07	.07	.075	.075		
049	.09	.08	.075	.075	.085	.085		
050	.09	.075	.075	.075	.08	.075		
051	.09	.075	.07	.07	.08	.075		
052	.08	.075	.065	.065	.075	.075		
TEST DATE	2-25-77	3-11-77	5-5-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 113 OF 188

TEST: Dissipation Factor @ 1KHz

TEST NO. XT-1218-B

TEST TEMP. -55°C

TEST VOLT. N/A

LAB SUPV. CRC 23 F/T

ENGR. D. K.

Q.A.

C.R.C. P/N M83421/01-1174R

CUST. P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:

Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:

There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator -	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temp. test chamber	Statham SD9-1	130
Thermometer	Marshall J E-485	1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.36	.35	.36	.36	.42	.35		
023	.35	.34	.36	.42	.35	.42		
024	.36	.36	.36	.37	.36	.36		
025	.36	.35	.36	.36	.35	.36		
026	.36	.36	.36	.36	.36	.36		
027	.36	.35	.36	.36	.35	.42		
028	.37	.36	.36	.37	.36	.37		
029	.35	.35	.35	.36	.42	.35		
030	.35	.34	.36	.49	.46	.44		
032	.36	.36	.44	.51	.47	.45		
033	.35	.38	.36	.36	.35	.44		
034	.34	.34	.34	.35	.34	.34		
035	.34	.34	.34	.34	.36	.37		
036	.35	.35	.35	.36	.36	.42		
037	.36	.38	.36	.36	.54	.39		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-17-77	6-27-77		
TEST BY	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-1

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ -55°C

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174R
CUST P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.36	.36	.36	.37	.44	.41		
039	.36	.35	.36	.36	.44	.55		
040	.36	.35	.36	.37	.37	.48		
041	.36	.43	.52	.5	.45	.38		
042	.34	.34	.34	.35	.34	.34		
043	.34	.35	.34	.35	.33	.34		
044	.36	.43	.35	.36	.35	.37		
045	.36	.38	.35	.36	.36	.36		
046	.35	.36	.35	.36	.34	.35		
047	.36	.36	.36	.52	.5	.49		
048	.35	.34	.35	.35	.35	.45		
049	.36	.36	.36	.36	.37	.36		
050	.36	.34	.39	.51	.51	.46		
051	.35	.31	.35	.36	.5	.36		
052	.35	.32	.35	.37	.35	.36		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-17-77	6-27-77		
TEST BY.	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 115 OF 188

TEST: Dissipation Factor @ 1KHz	LAB SUPVR. CRC FIT
TEST NO. XT-1218-B	ENGR.
TEST TEMP. +125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174 R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temp. test chamber - Statham SD9-1		130
Thermometer - Marshall J E-485		1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.025	.04	.03	.03	.035	.03		
023	.03	.055	.035	.035	.04	.035		
024	.025	.035	.03	.035	.035	.035		
025	.03	.035	.035	.035	.04	.035		
026	.03	.035	.03	.035	.085	.065		
027	.03	.035	.035	.035	.035	.035		
028	.035	.04	.04	.045	.055	.055		
029	.03	.04	.035	.035	.105	.05		
030	.03	.035	.035	.035	.05	.04		
032	.035	.03	.03	.03	.045	.035		
033	.03	.26	.035	.035	.045	.065		
034	.025	.035	.03	.03	.035	.035		
035	.025	.03	.025	.03	.045	.09		
036	.03	.035	.03	.035	.045	.04		
039	.025	.03	.03	.03	.06	.045		
TEST DATE	3-2-77	3-15-77	5-6-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ 125°C

TEST NO: XT-1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.025	.035	.03	.03	.04	.03		
039	.025	.03	.03	.025	.035	.025		
040	.025	.03	.025	.03	.035	.04		
041	.03	.035	.03	.035	.125	.125		
042	.025	.035	.025	.03	.035	.035		
043	.025	.03	.025	.03	.035	.03		
044	.025	.035	.025	.03	.035	.035		
045	.025	.06	.025	.03	.04	.04		
046	.03	.035	.035	.035	.045	.04		
047	.025	.03	.03	.03	.04	.025		
048	.03	.035	.035	.035	.04	.035		
049	.03	.04	.03	.035	.05	.1		
050	.025	.03	.03	.035	.04	.03		
051	.035	.03	.03	.035	.065	.055		
052	.035	.03	.03	.035	.035	.05		
TEST DATE	3-2-77	3-15-77	5-5-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 117 OF 188

TEST: Dissipation Factor @ 10 KHz	LAB SUPVR. CRC FIT
TEST NO. XT-1218-B	ENGR. D.K.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator -	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.18	.185	.21	.36	.27	.255		
023	.17	.16	.19	.18	.265	.26		
024	.17	.17	.19	.175	.25	.23		
025	.16	.17	.2	.185	.27	.25		
026	.18	.185	.21	.205	.28	.265		
027	.17	.195	.265	.2	.25	.26		
028	.20	.22	.21	.28	.43	.42		
029	.18	.185	.215	.215	.3	.295		
030	.23	.18	.2	.205	.265	.24		
032	.24	.185	.21	.185	.265	.235		
033	.25	.185	.215	.205	.31	.295		
034	.21	.16	.195	.165	.25	.235		
035	.25	.165	.185	.185	.265	.205		
036	.25	.175	.195	.2	.3	.285		
037	.22	.185	.195	.205	.29	.31		
TEST DATE	2-24-77	3-11-77	5-5-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10 KHz @ 25°C

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174R
CUST P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.24	.17	.19	.185	.26	.21		
039	.22	.17	.19	.19	.265	.23		
040	.24	.18	.195	.195	.28	.26		
041	.26	.175	.205	.2	.175	.35		
042	.24	.175	.195	.185	.265	.25		
043	.22	.17	.19	.18	.245	.235		
044	.24	.175	.195	.195	.29	.265		
045	.24	.175	.205	.195	.265	.265		
046	.24	.175	.2	.205	.3	.31		
047	.24	.175	.2	.195	.26	.235		
048	.28	.185	.205	.2	.275	.255		
049	.23	.18	.195	.195	.29	.29		
050	.24	.175	.205	.205	.27	.245		
051	.25	.175	.205	.205	.31	.46		
052	.22	.175	.19	.18	.26	.24		
TEST DATE	2-25-77	3-11-77	5-5-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 119 OF 188

TEST: Dissipation Factor @ 10KHz	LAB SUPVR. CRC FIT
TEST NO. XT-1218-B	ENGR. J.K.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION:
MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator -	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temp. test chamber -	Statham SD9-1	130
Thermometer -	Marshall J E-485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.5	.54	.51	.53	.92	.52		
023	.48	.52	.5	.73	.54	.51		
024	.51	.64	.51	.52	.54	.54		
025	.49	.56	.51	.52	.54	.51		
026	.5	.69	.53	.54	.54	.62		
027	.5	.51	.51	.52	.52	.52		
028	.56	.56	.56	.61	.62	.69		
029	.49	.56	.5	.52	.86	.52		
030	.52	.52	.52	.59	.65	.54		
032	.5	.55	.51	.6	.56	.56		
033	.49	.76	.51	.53	.59	.99		
034	.48	.53	.46	.51	.5	.49		
035	.48	.53	.48	.5	.69	.64		
036	.49	.55	.49	.52	.65	.73		
037	.5	.79	.49	.52	.56	.8		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-17-77	6-27-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10 KHz @ -55°C
TEST NO. XT-1218-B
C.R.C. P/N M83421/01-1174R
CUST P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.5	.6	.48	.51	.54	.49		
039	.49	.54	.49	.51	.54	.74		
040	.5	.54	.49	.52	.54	1.1		
041	.5	.62	.59	.59	.92	.70		
042	.48	.51	.47	.51	.51	.49		
043	.47	.64	.46	.49	.51	.5		
044	.5	1.6	.48	.52	.52	.66		
045	.5	.76	.49	.52	.62	.58		
046	.5	.66	.51	.54	.54	.55		
047	.5	.55	.49	.61	.58	.57		
048	.49	.54	.49	.51	.59	.55		
049	.5	.66	.5	.52	.72	.77		
050	.5	.55	.5	.6	.65	.55		
051	.5	.56	.49	.52	.95	.64		
052	.49	.56	.48	.51	.52	.54		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-17-77	6-27-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 121 OF 188

TEST: Dissipation Factor @ 10 KHz	LAB SUPVR. CRC 23 FIT
TEST NO. XT-1218-B	ENGR. J.K.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1174R
CUST. P/N
PROD. NO. 0237G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator -	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temp. test chamber -	Statham SD9-1	130
Thermometer -	Marshall J E-485	1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
022	.135	.24	.145	.19	.22	.165		
023	.12	.34	.14	.185	.2	.18		
024	.115	.195	.13	.145	.165	.14		
025	.125	.185	.145	.165	.2	.185		
026	.115	.175	.145	.16	.35	.39		
027	.13	.175	.15	.17	.16	.165		
028	.17	.23	.19	.295	.35	.37		
029	.145	.23	.17	.19	.43	.31		
030	.13	.19	.185	.165	.28	.225		
032	.125	.17	.14	.155	.21	.21		
033	.135	.56	.185	.17	.29	.45		
034	.11	.165	.115	.13	.16	.195		
035	.125	.195	.125	.145	.26	.49		
036	.125	.17	.12	.155	.27	.23		
037	.125	.16	.135	.145	.41	.28		
TEST DATE	3-2-77	3-15-77	5-6-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10 KHz @ +125°C

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174 R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
038	.115	.17	.115	.135	.175	.14		
039	.115	.165	.135	.135	.18	.14		
040	.115	.16	.115	.14	.185	.25		
041	.125	.195	.125	.16	.6	.34		
042	.115	.18	.125	.145	.19	.4		
043	.12	.165	.12	.14	.19	.165		
044	.12	.195	.12	.145	.185	.175		
045	.115	.5	.115	.14	.165	.3		
046	.125	.18	.14	.165	.215	.25		
047	.115	.165	.125	.145	.18	.13		
048	.125	.175	.14	.145	.205	.165		
049	.125	.215	.135	.155	.31	.52		
050	.12	.165	.135	.18	.23	.145		
051	.125	.165	.14	.18	.47	.41		
052	.115	.15	.125	.15	.19	.31		
TEST DATE	3-2-77	3-15-77	5-5-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street • Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 123 OF 188

TEST: E.S.R.	LAB SUPVR. CRC² F/T	C.R.C. P/N M83421/01-1174R
TEST NO. XT-1218-B	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0237G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION:

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C (1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established E.S.R. limits for this test condition

EQUIPMENT USED:

	Model No.	ECN No.
E.S.R. meter - Clark & Hess	273	1130
Cable assembly Clark & Hess	27375	1130

S/N	E.S.R. WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial E.S.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
	IN Ω	IN Ω	IN Ω	IN Ω	IN Ω	IN Ω		
022	.16	.18	.18	.20	.22	.22		
023	.14	.15	.15	.18	.22	.24		
024	.15	.16	.15	.18	.20	.19		
025	.15	.16	.17	.19	.22	.22		
026	.15	.17	.19	.20	.23	.23		
027	.16	.17	.17	.20	.22	.23		
028	.19	.24	.28	.35	.43	.47		
029	.16	.19	.21	.24	.28	.29		
030	.16	.18	.18	.21	.22	.22		
032	.16	.17	.18	.20	.20	.19		
033	.16	.18	.19	.23	.26	.28		
034	.14	.15	.15	.17	.20	.21		
035	.15	.17	.17	.20	.21	.24		
036	.16	.17	.18	.23	.26	.29		
037	.15	.16	.16	.19	.25	.31		
TEST DATE	2-25-77	3-11-77	5-4-77	6-2-77	6-14-77	6-29-77		
TEST BY	CRC² F/T	CRC² F/T	CRC² F/T	CRC² F/T	CRC² F/T	CRC² F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: E.S.R. @ 25°C

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	E.S.R. WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial E.S.R. In Ω	After 20 Ω Cycles	After 140 Ω Cycles	After 260 Ω Cycles	After 380 Ω Cycles	After 500 Ω Cycles		
038	.15	.16	.16	.18	.19	.18		
039	.14	.16	.16	.18	.20	.18		
040	.14	.16	.16	.19	.22	.23		
041	.16	.17	.19	.21	.21	.20		
042	.16	.17	.17	.20	.22	.22		
043	.14	.16	.16	.18	.20	.21		
044	.15	.16	.16	.19	.22	.24		
045	.14	.16	.16	.19	.22	.23		
046	.16	.17	.18	.23	.27	.31		
047	.15	.16	.17	.19	.19	.19		
048	.17	.18	.19	.21	.22	.23		
049	.16	.17	.18	.20	.24	.28		
050	.15	.16	.17	.20	.21	.21		
051	.16	.17	.18	.22	.23	.53		
052	.15	.16	.17	.20	.20	.19		
TEST DATE	2-25-71	3-11-71	5-4-71	6-2-71	6-14-71	6-29-71		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Seal Test (Fine Leak Test)	LAB SUPVR. CRC 2 FIT
TEST NO. XT-1218-B	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	C.R.C. P/N M83421/01-1174 R
SPECIAL NOTES: Normal Thermal Shock per TP-1006 (Air to Air) 500 Cycles -55°C to +125°C (1 hr. per cycle)	CUST. P/N
ACCEPTANCE LIMITS: Leakage not to exceed $1X10^{-6}$ atm/cc/sec.	PROD. NO. 0237G
	P/O NO. NAS8-32403
	SPECIFICATION: MIL-C-83421, Para. 4.7.5
	EQUIPMENT USED: Fine leak detector - DuPont 24-120B, Model No. 651, ECN No.

S/N	Initial $1X10^{-6}$		After 20 hr. $1X10^{-6}$		After 140 hr. $1X10^{-6}$		After 260 hr. $1X10^{-6}$		After 380 hr. $1X10^{-6}$		After 500 hr. $1X10^{-6}$		
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	
022	✓		✓		✓		✓		✓		✓		
023	↑		↑		↑		↑		↑			X	
024											↑		
025													
026													
027													
028													
029													
030													
032													
033													
034													
035													
036	↓		↓		↓		↓		↓		↓		
037	✓		✓		✓		✓		/		/		
TEST DATE	2-28-77		3-16-77		5-10-77		6-2-77		6-15-77		7-1-77		
TEST BY	/ CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Seal Test (Fine Leak Test)

TEST NO. XT-1218-B

C.R.C. P/N M83421/01-1174R

CUST P/N

PROD. NO. 0237G

P/O NO. NAS8-32403

S/N	Initial		After 20 hr		After 140 hr		After 260 hr		After 380 hr		After 500 hr		
	$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		$1X10^{-6}$		
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	
038	✓		✓		✓		✓		✓			✓	
039	↑		↑		↑		↑		↑		✓		
040											↓		
041													
042													
043													
044													
045													
046													
047													
048													
049													
050											↓		
051	↓		↓		↓		↓		↓		✓		
052	✓		✓		✓		✓		✓			✓	
TEST DATE	2-28-77		3-16-77		5-10-77		6-2-77		6-15-77		7-1-77		
TEST BY	CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

TEST REPORT SUMMARY

THERMAL SHOCK
AIR TO AIR
500 CYCLES
-55°C to +125°C

TEST NO.
REPORT #XT-1218-C

PROD. NO. 0238G
LOT
LOT SIZE 30
C.R.C. P/N M83421/01-1186R
DATE COMPLETED July 1, 1977

CUSTOMER NASA, MARSHALL SPACE FLIGHT CENTER
CUSTOMER P/N
CUSTOMER P/O NAS8-32403
C.R.C. S/O 704-35622

TEST	REQUIREMENT	METHOD PARAGRAPH	ACC / REJ
Insulation Resistance	3.11	4.7.7	29 / 1
Capacitance	N/A	4.7.8	30 / 0
Dissipation Factor	3.13	4.7.9	30 / 0
E.S.R.			30 / 0
Seal Test	3.9	4.7.5	21 / 9

QUALITY CONTROL DATE

SHIPPING DATA

ORDER #	DATE SHIPPED	QTY SHIPPED	INVOICE #	QTY STOCKED

N/A

F-634-3

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O # 704-35622 SHEET 128 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 23 FIT
TEST NO. XT-1218-C	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. 30 VDC	

C.R.C. P/N M83421/01-1186 R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
45pA maximum or 666,000 megohms minimum.
After 500 cycles air to air thermal shock there are no established limits for maximum leakage current @ 25°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V-Ammeter	H.P. 425A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter -	Simpson 260	1357
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
086	10	12	6	9	7	8		
087	14	13	8	9	6	9		
088	14	18	7	6	7	8		
089	18	14	7	5	8	9		
090	12	15	7	8	7	8		
091	13	12	7	10	8	8		
092	6	10	6	6	6	8		
093	7	10	8	10	7	7		
094	6	5	5	11	9	8		
095	6	6	8	6	5	7		
096	6	12	5	7	8	8		
097	7	6	5	9	7	8		
098	5	12	6	8	8	8		
099	5	7	10	10	7	8		
100	7	6	8	9	8	10		
TEST DATE	2-25-77	3-11-77	5-4-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 129 OF 188

TEST: Insulation Resistance @ 25°C (Terminal to Terminal)

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R
CUST P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
101	5	7	7	10	7	8		
102	6	6	7	10	5	7		
103	6	6	7	9	5	8		
104	6	9	8	10	6	8		
105	6	7	8	9	5	7		
106	6	8	8	9	6	5		
108	5	6	6	9	5	7		
109	3	12	8	10	5	7		
110	7	5	9	10	5	5		
111	9	11	9	12	4	7		
112	8	12	8	13	5	6		
113	7	9	8	10	5	6		
114	7	5	2	10	7	7		
116	8	5	7	14	8	7		
117	8	15	.27µA	180µA	2.6µA	8.6µA		
TEST DATE	2-25-77	3-11-77	5-4-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC F/T	F/T CRC	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 130 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPV. CRC FIT	C.R.C. P/N M83421/01-1186R
TEST NO. XT-1218-C	ENGR.	CUST. P/N
TEST TEMP. -55°C	Q.A.	PROD. NO. 0238G
TEST VOLT. 30 VDC		P/O NO. NAS8-32403

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

SPECIFICATION:
MIL-C-83421, Para. 4.7.7

ACCEPTANCE LIMITS:
There are no established limits for maximum leakage current @ -55°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V-Ammeter	H.P. 425A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter - Simpson 260		1357
Temperature test chamber - Statham	SDG-1	130
Thermometer - Marshall J	E-485	1588
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
086	10	29	27	25	19	40		
087	13	19	29	28	21	45		
088	12	18	25	30	43	72		
089	12	30	42	25	22	50		
090	10	16	35	30	45	70		
091	13	12	30	56	27	45		
092	13	20	30	28	42	75		
093	10	19	28	55	41	68		
094	10	15	29	25	42	78		
095	12	21	32	55	16	45		
096	10	15	20	22	12	66		
097	10	21	17	18	17	120		
098	11	22	34	21	35	84		
099	10	17	32	20	16	55		
100	16	20	30	18	14	52		
TEST DATE	3-1-77	3-17-77	5-9-77	5-31-77	6-17-77	6-28-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ -55°C (Terminal to Terminal)

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186 R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
101	15	18	30	25	18	54		
102	12	18	23	17	19	50		
103	15	27	27	15	43	82		
104	16	24	31	42	33	84		
105	14	22	27	43	42	84		
106	12	33	27	42	25	90		
108	14	19	31	17	38	125		
109	12	19	40	43	22	85		
110	13	19	30	55	42	82		
111	12	8	25	32	34	75		
112	14	20	20	34	17	130		
113	9	26	25	35	20	55		
114	11	19	35	90	20	42		
116	15	17	30	40	30	22		
117	14	10	200 µA	340 µA	10 µA	70 µA		
TEST DATE	3-1-77	3-17-77	5-9-77	5-31-77	6-17-77	6-28-77		
TEST BY	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 132 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 23 F/T	C.R.C. P/N M83421/01-1186 R
TEST NO. XT-1218-C	ENGR.	CUST. P/N
TEST TEMP. 125°C	Q.A.	PROD. NO. 0238G
TEST VOLT. 18 VDC		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
2250 pA maximum or 8,000 megohms minimum.
After 500 cycles air to air thermal shock there are no established limits for maximum leakage current @ +125°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V. Ammeter	H.P. 425A	1480
I.R. test rack	CRC none	647
D.C. volt ohm meter	Simpson 260	1357
Temperature test chamber	Statham SDG-1	130
Thermometer - Marshall J	E-485	1588
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
086	400	230	350	360	130	130		
087	360	450	290	380	350	370		
088	420	380	410	530	550	290		
089	680	330	260	290	330	370		
090	1500	260	320	470	320	200		
091	900	210	270	120	400	310		
092	1100	240	130	300	330	160		
093	1800	730	430	570	400	210		
094	1100	630	300	550	950	340		
095	900	260	190	560	480	280		
096	830	470	210	430	400	350		
097	800	540	830	900	430	380		
098	260	400	410	280	280	270		
099	1300	280	490	240	420	55		
100	700	530	580	330	125	240		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-17-77	6-29-77		
TEST BY	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T	CRC 2 F/T		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ 125°C (Terminal to Terminal)
TEST NO. XT-1218-C
C.R.C. P/N M83421/01-1186R
CUST P/N
PROD. NO 0238G
P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
101	600	330	950	250	410	240		
102	660	370	390	500	360	400		
103	760	590	670	570	650	260		
104	400	420	260	390	720	190		
105	600	550	630	550	450	400		
106	460	570	370	410	540	200		
108	320	780	650	330	580	290		
109	360	950	910	700	250	380		
110	1050	450	350	330	240	230		
111	600	500	1400	2050	275	2000		
113	500	850	570	910	560	340		
113	900	610	750	430	920	620		
114	500	460	210	990	1100	370		
116	460	320	410	370	240	240		
117	1500	5900	11µA	115µA	92µA	92µA		
TEST DATE	3-1-77	3-16-77	5-9-77	5-31-77	6-17-77	6-29-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 134 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR. CRC 23 FIT
TEST NO. XT-1218-C	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1186 R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
.135uF to .165uF
After 500 cycles air to air thermal shock there are no established % capacitance drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap. In	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
086	.148335	+.035	+.065	+.13	+.16	+.185		
087	.149630	+.045	+.105	+.135	+.215	+.29		
088	.148703	+.04	+.115	+.18	+.225	+.25		
089	.150061	+.025	+.05	+.085	+.15	+.295		
090	.148003	+.04	+.085	+.095	+.085	+.095		
091	.148746	+.05	+.09	+.185	+.275	+.46		
092	.146389	+.045	+.085	+.14	+.17	+.265		
093	.151276	+.03	+.06	+.155	+.28	+.4		
094	.149891	+.035	+.045	+.105	+.15	+.175		
095	.148260	+.055	+.085	+.145	+.175	+.18		
096	.148091	+.055	+.15	+.215	+.24	+.27		
097	.150944	+.015	+.045	+.08	+.105	+.215		
098	.149056	+.05	+.155	+.2	+.22	+.26		
099	.148114	+.04	+.1	+.175	+.145	+.24		
100	.151329	+.035	+.1	+.13	+.17	+.19		
TEST DATE	2-25-77	3-11-77	5-3-77	5-27-77	6-14-77	6-30-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622

TEST: Capacitance drift with thermal shock

TEST NO. XT-1218-C

C.R.C. P/N M83421/01 - 1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	Initial capacitance in uF	Percent capacitance change with thermal shock -55°C to +125°C: After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.148386	±.025	±.1	±.16	±.185	±.195		
102	.149718	±.06	±.135	±.21	±.3	±.39		
103	.148084	±.045	±.11	±.195	±.27	±.36		
104	.149354	±.045	±.095	±.17	±.24	±.34		
105	.150858	±.01	±.09	±.15	±.17	±.205		
106	.147468	±.03	±.15	±.165	±.24	±.33		
108	.148893	±.035	±.235	±.27	±.29	±.38		
109	.148410	±.045	±.12	±.195	±.27	±.36		
110	.149340	±.065	±.155	±.15	±.195	±.33		
111	.151038	±.075	±.17	±.215	±.24	±.26		
112	.149596	±.04	±.105	±.15	±.17	±.235		
113	.148946	±.06	±.105	±.16	±.165	±.165		
114	.153162	±.06	±.145	±.225	±.255	±.41		
116	.148967	±.05	±.095	±.11	±.115	±.165		
117	.146771	±.06	±.38	±1.1	±1.6	±1.1		
TEST DATE	2-25-71	3-11-71	5-3-71	5-27-71	6-14-71	6-30-71		
TEST BY	LJ & JG	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-3562

TEST: Capacitance drift with thermal shock

LAB SUPVR.

ENGR.

Q.A.

TEST NO. XT-1218-C

TEST TEMP. -55°C

TEST VOLT. N/A

C.R.C. P/N M83421/01-1186R

CUST. P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

SPECIFICATION:

MIL-C-83421, para. 4.7.8

SPECIAL NOTES:

Normal thermal shock per T.P. 1006
(Air to Air) 500 cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:

There are no established initial cap. and % cap. drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer	Marshall J E-485	1588

S/N	Initial capacitance in u.f.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
	Percent capacitance change with thermal shock -55°C to +125°C							
086	.146421	-.05	+.12	+.15	+.22	+.22		
087	.147590	-.05	+.12	+.155	+.2	-.155		
088	.146830	-.055	+.13	+.19	+.28	+.3		
089	.148130	-.015	+.09	-.065	+.14	-.29		
090	.146195	-.035	+.08	+.095	+.075	+.095		
091	.146855	-.05	-.095	-.18	+.19	-.115		
092	.146550	-.05	+.09	+.135	+.025	-.34		
093	.149300	-.05	-.31	-.3	+.28	-.29		
094	.146060	-.08	+.055	+.125	+.19	+.175		
095	.146330	-.075	+.11	+.18	+.21	+.165		
096	.146340	-.09	+.15	+.2	+.24	+.245		
097	.149040	-.045	+.12	+.145	-.015	-.39		
098	.149220	-.05	+.195	+.215	+.24	+.255		
099	.146260	-.06	+.13	+.19	+.19	+.145		
100	.149360	-.04	+.1	+.175	+.15	+.2		
TEST DATE	3-1-77	3-17-77	5-9-77	5-31-77	6-17-77	6-29-77		
TEST BY	CRC PIT	CRC PIT	CRC PIT	CRC PIT	CRC PIT	CRC PIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 137 OF 188

TEST: Capacitance drift @ -55°C with thermal shock

TEST NO. XT-1218-C

C.R.C. P/N M83421/01 - 1186R
CUST P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

S/N	Initial capacitance in u.f.	Percent capacitance change with thermal shock -55°C to +125°C: After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.146520	-.03	+.145	+.23	+.2	+.22		
102	.147920	-.04	+.15	-.18	+.125	-.3		
103	.146200	-.045	+.115	-.225	+.24	-.195		
104	.147350	-.055	+.115	-.14	+.25	-.14		
105	.148880	-.075	+.135	+.175	+.22	+.165		
106	.145598	-.055	+.095	-.22	+.23	-.37		
108	.147019	-.079	+.17	+.245	+.27	-.27		
109	.146529	-.055	-.29	-.235	+.365	-.205		
110	.147439	-.05	+.045	-.055	+.075	-.31		
111	.149179	-.07	+.065	+.2	+.15	+.225		
112	.147743	-.025	+.05	+.18	+.16	+.04		
113	.147163	-.05	-.015	+.125	+.12	+.41		
114	.151217	-.005	+.095	-.31	+.04	-1.05		
116	.147177	-.06	+.015	+.075	+.085	+.13		
117	.147037	-.025	+.41	+.64	+.92	+.31		
TEST DATE		2-25-77	3-16-77	5-9-77	5-31-77	6-17-77	6-28-77	
TEST BY		CRC F²A	CRC F²A	CRC F²A	CRC F²A	CRC F²A	CRC F²A	

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance drift with thermal shock

TEST NO. XT-1218-C

TEST TEMP. 125°C

TEST VOLT. N/A

LAB SUPVR. 23 FEB

ENGR. O.K.

Q.A.

C.R.C. P/N M83421/01-1186R

CUST. P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

SPECIFICATION: Mil-C-83421, para. 4.7.8

SPECIAL NOTES:
Normal thermal shock per T.P. 1006
(Air to Air) 500 cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established initial capacitance and % cap. drift limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer - Marshall J	E-485	1588

S/N	Initial capacitance in u.f.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
	Percent capacitance change with thermal shock -55°C to +125°C							
086	.148472	+.045	+.005	+.03	+.035	+.04		
087	.149652	+.06	+.03	+.04	+.26	+.06		
088	.148822	+.055	+.025	+.065	+.1	+.025		
089	.150152	+.04	+.01	+.01	+.24	+.035		
090	.146032	+.045	-.005	+.005	+.005	-.03		
091	.148862	+.045	-.045	-.035	+.19	+.03		
092	.146532	+.045	+.005	+.025	+.155	+.03		
093	.151662	+.015	.000	+.215	+.32	+.01		
094	.147982	+.01	-.01	+.015	+.045	+.035		
095	.148462	+.04	+.015	+.035	+.045	+.01		
096	.148452	+.025	+.015	+.035	+.06	+.035		
097	.151002	+.05	-.01	+.01	+.1	-.01		
098	.149332	+.075	+.03	+.035	+.05	+.02		
099	.148362	+.055	+.03	+.065	+.035	+.005		
100	.151622	+.055	+.015	+.035	+.04	-.005		
TEST DATE	3-1-77	3-17-77	5-6-77	5-31-77	6-17-77	6-29-77		
TEST BY								

F-634-1

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622

TEST: Capacitance drift @ +125°C with thermal shock

C.R.C. P/N M83421/01-1186R
CUST P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

TEST NO. XT-1218-C

S/N	Percent capacitance change with thermal shock -55°C to +125°C							
	Initial capacitance in u.f.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.146642	+.065	+.075	+.035	+.05	+.005		
102	.149999	+.065	+.03	+.225	+.32	+.03		
103	.148399	+.07	+.015	+.225	+.35	+.045		
104	.149479	+.065	0.00	+.205	+.29	+.035		
105	.151069	+.075	+.035	+.065	+.1	+.07		
106	.149549	+.135	+.06	+.23	+.3	+.015		
108	.149169	+.23	+.135	+.13	-.195	+.12		
109	.148499	+.105	+.105	+.19	+.32	+.025		
110	.149629	+.055	+.035	+.015	+.19	-.005		
111	.151389	+.085	+.045	+.05	+.06	+.015		
112	.149749	+.065	+.04	+.035	+.055	+.025		
113	.149169	+.06	+.005	+.015	+.04	+.01		
114	.153479	+.07	+.035	+.15	+.34	+.065		
116	.149219	+.065	+.01	-.005	-.005	-.03		
117	.148939	+.055	+.65	+5.0	+1.65	+1.45		
TEST DATE	3-1-77	3-17-77	5-6-77	5-31-77	6-17-77	6-30-77		
TEST BY	CRC TEST	CRC TEST	CRC TEST	CRC TEST	CRC TEST	CRC TEST		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 140 OF 188

TEST: Dissipation factor @ 1KHz	LAB SUPVR.
TEST NO. XT-1218-C	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1186R

CUST. P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

SPECIFICATION: Mil-C-83421, para. 4.7.9

SPECIAL NOTES:
Normal thermal shock per T.P. 1006
(Air to Air) 500 cycles
-55°C to +125°C, 1 Hr. per cycle

ACCEPTANCE LIMITS:
After 500 cycles air to air thermal shock there are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

S/N	Percent dissipation factor with thermal shock -55°C to +125							
	Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
086	.07	.08	.07	.08	.075	.075		
087	.07	.08	.07	.08	.075	.08		
088	.07	.085	.075	.085	.085	.085		
089	.07	.085	.075	.085	.075	.08		
090	.07	.085	.075	.085	.08	.08		
091	.07	.08	.07	.08	.08	.075		
092	.075	.09	.08	.095	.095	.1		
093	.07	.085	.075	.085	.085	.075		
094	.07	.08	.065	.08	.075	.075		
095	.07	.085	.065	.075	.075	.08		
096	.065	.08	.07	.08	.075	.08		
097	.07	.085	.075	.085	.08	.085		
098	.07	.085	.075	.085	.085	.085		
099	.07	.08	.075	.085	.08	.085		
100	.07	.085	.075	.08	.075	.08		
TEST DATE	2-25-77	3-11-77	5-3-77	5-27-77	6-14-77	6-30-77		
TEST BY	J/J	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622

TEST: Dissipation factor @ 1KHz @ 25°C

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	Percent dissipation factor with thermal shock (-55°C to +125°C)							
	Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.07	.075	.075	.08	.075	.065		
102	.07	.08	.07	.085	.085	.08		
103	.07	.08	.065	.085	.085	.075		
104	.075	.085	.075	.09	.085	.085		
105	.075	.085	.075	.085	.085	.065		
106	.07	.075	.075	.085	.085	.08		
108	.07	.085	.075	.085	.085	.065		
109	.07	.08	.065	.08	.08	.075		
110	.07	.08	.075	.085	.085	.08		
111	.07	.085	.075	.085	.085	.085		
112	.07	.075	.065	.08	.075	.075		
113	.07	.08	.07	.075	.085	.065		
114	.07	.085	.07	.085	.085	.08		
116	.07	.075	.07	.075	.075	.145		
117	.07	.08	.075	.84	.09	.08		
TEST DATE	2-28-77	3-11-77	5-3-77	5-27-77	6-14-77	6-30-77		
TEST BY	CRC² FIT	CRC² FIT	CRC² FIT	CRC² FIT	CRC² FIT	CRC² FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 142 OF 188

TEST: Dissipation factor @ 1KHz
TEST NO. XT-1218-C
TEST TEMP. -55°C
TEST VOLT. N/A

LAB SUPVR. CRC 23 FIT
ENGR. O.K.
Q.A.

C.R.C. P/N M83421/01-1186 R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION:
MIL-C-83421, para. 4.7.9

SPECIAL NOTES:
Normal thermal shock per T.P. 1006
(Air to Air) 500 cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision Decade capacitor	G.R. 1413	1387
Temperature test chamber - Statham SDG-1		130
Thermometer - Marshall J E-485		1588

S/N	Percent dissipation factor with thermal shock (-55°C to +125°C)							
	Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
086	.40	.38	.37	.38	.36	.36		
087	.40	.4	.39	.39	.51	.56		
088	.36	.41	.37	.39	.36	.41		
089	.37	.37	.37	.46	.64	.6		
090	.37	.36	.37	.38	.37	.39		
091	.35	.36	.4	.45	.49	.63		
093	.38	.38	.38	.39	.47	.65		
093	.37	.37	.5	.51	.64	.5		
094	.36	.36	.37	.38	.37	.37		
095	.37	.37	.37	.39	.51	.4		
096	.37	.36	.36	.37	.36	.36		
097	.36	.39	.37	.38	.44	.49		
098	.37	.42	.37	.37	.36	.66		
099	.37	.36	.38	.39	.38	.44		
100	.37	.39	.37	.38	.58	.39		
TEST DATE	3-1-77	3-17-77	5-9-77	5-31-77	6-17-77	6-29-77		
TEST BY	CRC 23 FIT	CRC 23 FIT	CRC 23 FIT	CRC 23 FIT	CRC 23 FIT	CRC 23 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 143 OF 188

TEST: Dissipation factor @ 1KHz @ -55°C

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	Percent dissipation factor with thermal shock (-55°C to +125°C) Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.36	.36	.37	.38	.44	.4		
102	.37	.37	.38	.52	.52	.67		
103	.36	.36	.37	.5	.52	.5		
104	.37	.4	.38	.52	.62	.5		
105	.37	.38	.38	.39	.38	.47		
106	.36	.5	.37	.53	.56	.5		
108	.36	.39	.37	.38	.67	.55		
109	.36	.36	.47	.59	.51	.51		
110	.37	.38	.39	.44	.49	.53		
111	.37	.36	.39	.39	.37	.46		
112	.36	.36	.37	.37	.51	.41		
113	.36	.36	.37	.38	.44	.66		
114	.37	.37	.38	.5	.49	.49		
116	.35	.36	.36	.37	.52	.39		
117	.36	.38	7.5	.53	.52	.61		
TEST DATE	2-28-77	3-16-77	5-9-77	5-31-77	6-17-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 144 OF 188

TEST: Dissipation factor @ 1KHz	LAB SUPV. CRC FIT
TEST NO. XT-1218-C	ENGR. D. K.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1186R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, para. 4.7.9

SPECIAL NOTES:
Normal thermal shock per T.P. 1006
(Air to Air) 500 cycles
-55°C to 125°C, 1 HR. per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade cap.	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer - Marshall J	E-485	1588

Percent dissipation factor with thermal shock (-55°C to +125°C)

S/N	Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
086	.08	.04	.035	.035	.04	.04		
087	.08	.04	.035	.035	.055	.045		
088	.04	.05	.04	.045	.05	.065		
089	.04	.04	.035	.035	.14	.06		
090	.04	.045	.035	.04	.05	.075		
091	.03	.04	.03	.03	.07	.06		
092	.04	.05	.045	.045	.065	.065		
093	.04	.045	.035	.035	.21	.035		
094	.03	.035	.03	.035	.045	.035		
095	.03	.04	.035	.035	.045	.055		
096	.03	.045	.03	.035	.045	.035		
097	.04	.045	.035	.045	.06	.045		
098	.04	.045	.04	.04	.05	.065		
099	.03	.045	.04	.04	.045	.045		
100	.04	.045	.04	.035	.07	.135		
TEST DATE	3-1-77	3-17-77	5-6-77	5-31-77	6-17-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622

TEST: Dissipation factor @ 1KHz @ 125°C

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	Percent dissipation factor with thermal shock (-55°C to +125°C) Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.04	.045	.035	.035	.045	.055		
102	.04	.04	.035	.035	.045	.08		
103	.04	.04	.035	.035	.05	.035		
104	.04	.045	.04	.04	.1	.045		
105	.04	.05	.045	.045	.055	.06		
106	.04	.04	.035	.035	.05	.05		
108	.04	.045	.035	.04	.095	.09		
109	.03	.04	.03	.035	.04	.03		
110	.04	.045	.035	.035	.44	.17		
111	.04	.045	.04	.045	.045	.23		
112	.03	.04	.03	.035	.045	.035		
113	.03	.04	.03	.035	.04	.14		
114	.04	.04	.035	.035	.04	.04		
116	.03	.04	.03	.03	.075	.105		
117	.04	.045	1.45	6.5	1.75	.9		
TEST DATE	3-1-77	3-17-77	5-6-77	5-31-77	6-17-77	6-29-77		
TEST BY	C2C FIT	C2C FIT	C2C FIT	C2C FIT	C2C FIT	C2C FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 146 OF 188

TEST: Dissipation factor @ 10KHz	LAB SUPVR. CRC F.I.T.	C.R.C. P/N M83421/01-1186R
TEST NO. XT-1218-C	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, para. 4.7.9

SPECIAL NOTES:
Normal thermal shock per T.P. 1006
(Air to Air) 500 cycles
-55°C to +125°C, 1 hour per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition

EQUIPMENT USED:

	Model No.	ECN
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	

S/N	Percent dissipation factor with thermal shock -55°C to +125°C							
	Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
086	.15	.175	.18	.195	.205	.215		
087	.15	.18	.175	.195	.205	.21		
088	.17	.21	.22	.26	.28	.31		
089	.15	.185	.175	.2	.2	.205		
090	.155	.195	.195	.225	.24	.255		
091	.15	.175	.175	.195	.205	.21		
092	.195	.245	.265	.31	.37	.42		
093	.145	.165	.18	.205	.205	.205		
094	.15	.175	.16	.19	.195	.205		
095	.14	.175	.17	.19	.21	.235		
096	.14	.165	.155	.18	.19	.21		
097	.15	.185	.2	.23	.245	.175		
098	.165	.21	.23	.255	.265	.31		
099	.15	.185	.205	.245	.25	.26		
100	.145	.17	.165	.185	.2	.21		
TEST DATE	2-25-77	3-11-77	5-3-77	5-27-77	6-14-77	6-30-77		
TEST BY	CRC F.I.T.	CRC F.I.T.	CRC F.I.T.	CRC F.I.T.	CRC F.I.T.	CRC F.I.T.		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622

TEST: Dissipation factor @ 10 KHz @ 25°C
TEST NO. XT-1218-C
C.R.C. P/N M83421/01-1186R
CUST P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

S/N	Percent dissipation factor with thermal shock (-55°C to +125°C) Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.15	.165	.175	.18	.205	.205		
102	.15	.175	.17	.215	.22	.23		
103	.16	.175	.165	.205	.21	.215		
104	.2	.225	.22	.26	.26	.275		
105	.18	.22	.23	.265	.28	.29		
106	.15	.165	.195	.215	.225	.23		
108	.165	.2	.205	.235	.26	.28		
109	.145	.16	.15	.175	.175	.175		
110	.15	.175	.165	.205	.22	.22		
111	.165	.19	.195	.225	.26	.3		
112	.15	.165	.155	.18	.165	.19		
113	.145	.16	.155	.175	.175	.17		
114	.155	.175	.16	.19	.165	.195		
116	.14	.16	.16	.18	.19	.54		
119	.155	.175	.18	.31	.24	.225		
TEST DATE	2-28-77	3-11-77	5-3-77	5-27-77	6-14-77	6-30-77		
TEST BY	CRC E²T	CRC E²T	CRC E²T	CRC E²T	CRC E²T	CRC E²T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 148 OF 188

TEST: Dissipation factor @ 10 KHz	LAB SUPVR. C.R.C. FIT
TEST NO. XT-1218-C	ENGR. A. K.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1186R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, para. 4.7.9

SPECIAL NOTES:
Normal thermal shock per T.P. 1006
(Air to Air) 500 cycles
-55°C to 125°C, 1 hour per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade cap.	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer - Marshall J	E-485	1588

Percent dissipation factor with thermal shock (-55°C to +125°C)

S/N	Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
086	.88	.62	.53	.56	.56	.54		
087	.9	.57	.65	.56	.67	1.05		
088	.55	.59	.58	.6	.63	.94		
089	.54	.56	.53	.57	1.10	1.35		
090	.55	.57	.54	.57	.59	.66		
091	.52	.55	.51	.56	.65	1.15		
092	.59	.66	.6	.63	.74	1.1		
093	.55	.57	.69	.62	1.45	.59		
094	.53	.56	.54	.55	.62	.53		
095	.53	.56	.53	.56	1.15	.82		
096	.53	.55	.51	.54	.57	.54		
097	.54	.62	.56	.59	.7	.67		
098	.55	.66	.57	.6	.61	1.5		
099	.54	.57	.57	.6	.59	1.0		
100	.52	.76	.52	.56	1.25	.79		
TEST DATE	2-28-77	3-16-77	5-9-77	5-31-77	6-17-77	6-29-77		
TEST BY	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT	C.R.C. FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622

TEST: Dissipation factor @ 10KHz @ -55°C

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	Percent dissipation factor with thermal shock (-55°C to +125°C) Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.51	.55	.54	.56	.84	.84		
102	.55	.56	.54	.65	.69	1.25		
103	.51	.55	.52	.63	.68	.62		
104	.56	.84	.61	.67	1.05	.66		
105	.57	.67	.58	.61	.7	.9		
106	.52	.84	.52	.63	.95	.68		
108	.55	.76	.55	.6	1.0	.94		
109	.50	.56	.52	1.65	.65	.75		
110	.53	.6	.53	.57	.75	.85		
111	.55	.59	.55	.59	.59	.91		
112	.51	.55	.51	.54	1.35	.65		
113	.52	.56	.5	.54	.94	1.25		
114	.52	.61	.51	.59	.6	.62		
116	.52	.56	.5	.54	1.05	.74		
117	.52	.59	1.15	.66	.8	.59		
TEST DATE	2-26-71	3-16-71	5-9-71	5-31-71	6-17-71	6-29-71		
TEST BY	[illegible]	[illegible]	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO.,INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 150 OF 188

TEST: Dissipation factor @ 10KHz	LAB SUPVR. CRC FIT
TEST NO. XT-1218-C	ENGR. L.K.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1186R
CUST. P/N
PROD. NO. 0238G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, para. 4.7.9

SPECIAL NOTES:
Normal thermal shock per T.P. 1006
(Air to Air) 500 cycles
-55°C to +125°C, 1 Hr. per cycle

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade cap.	G.R. 1413	1387
Temperature test chamber	Statham SDG-1	130
Thermometer - Marshall J	E-485	1588

S/N	Percent Dissipation Factor with Thermal Shock (-55°C to +125°C)							
	Initial D.F.	After 20 cycle	After 140 cycle	After 260 cycle	After 380 cycle	After 500 cycle		
086	.57	.215	.155	.18	.22	.24		
087	.58	.205	.155	.17	.32	.26		
088	.21	.31	.215	.24	.34	.49		
089	.19	.205	.165	.195	.27	.43		
090	.19	.225	.165	.215	.31	.53		
091	.15	.195	.15	.155	.34	.43		
092	.24	.3	.255	.3	.44	.44		
093	.19	.215	.19	.185	.39	.165		
094	.15	.19	.145	.165	.165	.165		
095	.15	.195	.16	.18	.36	.35		
096	.14	.22	.14	.15	.23	.175		
097	.16	.235	.165	.215	.32	.245		
098	.19	.27	.215	.24	.33	.48		
099	.16	.235	.16	.22	.26	.3		
100	.15	.215	.15	.175	.27	.8		
TEST DATE	3-1-77	3-17-77	5-6-77	5-31-77	6-17-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O-704-35622 SHEET 151 OF 188

TEST: Dissipation factor @ 10KHz @ +125°C

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	Percent dissipation factor with thermal shock (-55°C to +125°C) Initial D.F.	After 20 cycles	After 140 cycles	After 260 cycles	After 380 cycles	After 500 cycles		
101	.15	.205	.145	.175	.235	.34		
102	.16	.2	.15	.19	.26	.55		
103	.2	.2	.15	.185	.275	.21		
104	.21	.265	.21	.24	.3	.3		
105	.22	.275	.225	.265	.35	.4		
106	.16	.205	.155	.195	.3	.31		
108	.19	.26	.19	.22	.63	.59		
109	.14	.185	.125	.17	.195	.14		
110	.16	.225	.16	.165	.77	.49		
111	.18	.245	.18	.215	.25	.62		
112	.15	.215	.135	.15	.28	.195		
113	.14	.205	.125	.145	.225	1.0		
114	.15	.195	.14	.165	.195	.225		
116	.14	.215	.13	.155	.52	.54		
117	.16	.24	.36	1.25	.89	.66		
TEST DATE	3-1-77	3-17-77	5-6-77	5-31-77	6-17-77	6-29-77		
TEST BY	F/T 365	F/T 365	F/T 365	F/T 365	F/T 365	F/T 365		

F-634-2

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMERS NAME: NASA S/O-704-35622 SHEET 152 OF 188

TEST: E.S.R.	LAB SUPVR. CRC 23 FIT	C.R.C. P/N M83421/01-1186R
TEST NO. XT 1218-C	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0238G
TEST VOLT. N/A		P/O NO. NAS8-32403
SPECIAL NOTES: NORMAL thermal shock per T.P. 1006 (Air to Air) 500 cycles -55°C to +125°C (1 Hr. per cycle)		SPECIFICATION:

ACCEPTANCE LIMITS:

There are no established E.S.R. limits for this test condition.

EQUIPMENT USED:

	ECN No.
E.S.R. meter - Clark-Hess-273	1130
Cable Assembly Clark-Hess 27375	1130

S/N	ESR with thermal shock (-55°C to +125°C) Initial E.S.R. Ω	After 20 cycles Ω	After 140 cycles Ω	After 260 cycles Ω	After 380 cycles Ω	After 500 cycles Ω		
086	.11	.11	.13	.15	.16	.16		
087	.11	.10	.12	.14	.15	.15		
088	.15	.15	.16	.21	.24	.26		
089	.11	.11	.13	.14	.14	.14		
090	.12	.13	.15	.18	.20	.21		
091	.10	.11	.12	.14	.15	.14		
092	.19	.19	.22	.26	.33	.38		
093	.11	.12	.13	.15	.15	.14		
094	.11	.11	.11	.14	.14	.15		
095	.10	.11	.12	.14	.16	.17		
096	.10	.10	.11	.13	.14	.15		
097	.12	.12	.15	.18	.21	.22		
098	.14	.15	.18	.21	.24	.26		
099	.12	.13	.16	.19	.20	.20		
100	.11	.11	.11	.14	.15	.15		
TEST DATE	2-28-77	3-11-77	5-4-77	6-2-77	6-14-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O 704-35622 SHEET 153 OF 188

TEST: E.S.R. @ 25°C

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	E.S.R. with thermal shock (-55°C to +125°C) Initial E.S.R. Ω	After 20 cycles Ω	After 140 cycles Ω	After 260 cycles Ω	After 380 cycles Ω	After 500 cycles Ω		
101	.11	.11	.12	.14	.16	.17		
102	.11	.11	.12	.16	.16	.17		
103	.11	.11	.12	.15	.16	.15		
104	.15	.16	.17	.18	.21	.21		
105	.14	.17	.18	.22	.23	.23		
106	.10	.11	.13	.16	.17	.17		
108	.13	.14	.16	.19	.21	.21		
109	.10	.09	.10	.12	.12	.11		
110	.11	.11	.13	.16	.16	.16		
111	.12	.13	.15	.18	.21	.24		
112	.11	.10	.10	.12	.13	.12		
113	.10	.10	.10	.12	.13	.12		
114	.10	.10	.10	.12	.13	.12		
116	.10	.10	.10	.13	.15	1.02		
117	.11	.11	.12	.16	.16	.15		
TEST DATE	2-28-77	3-11-77	5-5-77	6-3-77	6-15-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O 704-35622 SHEET 154 OF 188

TEST: Seal test (fine leak test)	LAB SUPVR. CRC 23 FIT
TEST NO. XT 1218-C	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	C.R.C. P/N M83421/01-1186
	CUST. P/N
	PROD NO. 0238G
	P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, para. 4.7.5

SPECIAL NOTES:
Normal thermal shock per T.P. 1006
(Air to Air)
500 cycles
-55°C to +125°C (1 HR. per cycle)

ACCEPTANCE LIMITS:
Leakage not to exceed
1×10^{-6} ATM/cc/sec

EQUIPMENT USED: Model No. ECN No.
Fine leak detector - DuPont 24-120B 651

S/N	Initial 1×10^{-6}		After 20 cycles 1×10^{-6}		After 140 cycle 1×10^{-6}		After 260 cycle 1×10^{-6}		After 380 cycle 1×10^{-6}		After 500 cycle 1×10^{-6}	
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
086	✓		✓		✓		✓		✓		✓	
087	↑		↑		↑		↑		↑		↕	
088											↓	
089												X
090											✓	
091											↕	
092												
093												
094												
095												
096												
097											↓	
098											✓	
099	↓		↓		↓		↓		↓			X
100	✓		✓		✓		✓		✓		✓	
TEST DATE	2-28-77		3-16-77		5-10-77		6-2-77		6-15-77		7-1-77	
TEST BY	CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT		CRC 2 FIT	

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street • Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

CUSTOMER'S NAME: NASA S/O 704-35622 SHEET 155 OF 188

TEST: Seal test @ 25°C (Fine leak test)

TEST NO. XT-1218-C

C.R.C. P/N M83421/01-1186R

CUST P/N

PROD. NO. 0238G

P/O NO. NAS8-32403

S/N	Initial		After 20 cyc		After 140 cyc		After 260 cyc		After 380 cyc		After 500 cyc	
	1×10^{-6}		1×10^{-6}		1×10^{-6}		1×10^{-6}		1×10^{-6}		1×10^{-6}	
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
101	✓		✓		✓		✓		✓		✓	
102	↑		↑		↑		↑		↑			X
103	↑		↑		↑		↑		↑			X
104	↑		↑		↑		↑		↑		✓	
105	↑		↑		↑		↑		↑		✓	
106	↑		↑		↑		↑		↑		✓	
108	↑		↑		↑		↑		↑			X
109	↑		↑		↑		↑		↑			X
110	↑		↑		↑		↑		↑		✓	
111	↑		↑		↑		↑		↑		✓	
113	↑		↑		↑		↑		↑			X
113	↑		↑		↑		↑		↑		✓	
114	↑		↑		↑		↑		↑		✓	
116	↓		↓		↓		↓		↓			X
117	✓		✓		✓		✓		✓			X
TEST DATE	2-26-77		3-16-77		5-10-77		6-2-77		6-15-77		7-1-77	
TEST BY	LT 385 FIT		LT 385 FIT		CRC FIT		CRC FIT		CRC FIT		CRC FIT	

F-634-2

COMPONENT RESEARCH CO.,INC.

TEST REPORT SUMMARY

Thermal Shock
Air to Air
500 Cycles, -55°C to +125°C

TEST NO.

REPORT NO. XT-1218-A

PROD. NO. 0236G
LOT
LOT SIZE 30
C.R.C. P/N M83421/01-1090R
DATE COMPLETED July 1, 1977

CUSTOMER NASA, MARSHALL SPACE FLIGHT CENTER
CUSTOMER P/N
CUSTOMER P/O NAS8-32403
C.R.C. S/O 704-35622

TEST	REQUIREMENT	METHOD PARAGRAPH	ACC / REJ
Insulation Resistance	3.11	4.7.7	29 / 1
Capacitance	N/A	4.7.8	29 / 1
Dissipation Factor	3.13	4.7.9	29 / 1
E.S.R.			29 / 1
Seal Test	3.9	4.7.5	27 / 2

QUALITY CONTROL DATE

SHIPPING DATA

ORDER #	DATE SHIPPED	QTY SHIPPED	INVOICE #	QTY STOCKED

F-634-3

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 157 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR.	C.R.C. P/N M83421/01-1090 R
TEST NO. XT 1218-A	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0236G
TEST VOLT. 30VDC		P/O NO. NAS8-32403

SPECIAL NOTES:

Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles -55°C to +125°C
(1 hr. per cycle)

SPECIFICATION:

-MIL-C-83421, Para. 4.7.7

ACCEPTANCE LIMITS:

30pA maximum or 3,000,000 megohms minimum
After 500 cycles air to air thermal shock there are no established limits for maximum leakage current @ 25°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	H.P. 425 A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter	Simpson 260	1357
Battery pack	N/A	

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	1	3	2	2	2	2		
022	5	4	2	3	2	2		
023	5	4	2	3	2	2		
024	3	6	2	3	2	2		
025	1	3	2	2	2	2		
026	1	5	2	3	3	5		
027	3	4	3	3	2	6		
029	3	5	3	4	2	2		
030	1	5	2	3	2	1		
031	2	4	2	2	2	1		
032	2	4	2	2	2	1		
033	1	3	2	3	2	2		
034	2	4	2	3	2	2		
035	3	6	2	3	2	2		
036	3	4	3	2	2	2		
TEST DATE	2-24-71	3-11-71	5-4-71	5-27-71	6-14-71	6-29-71		
TEST BY								

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ 25°C (Terminal to Terminal)
C.R.C. P/N M83421/01-1030 R
CUST P/N
PROD. NO. 0236G
TEST NO. XT 1218-A
P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	INITIAL I.R.	AFTER 20 Cycles	AFTER 140 Cycles	AFTER 260 Cycles	AFTER 380 Cycles	AFTER 500 Cycles		
037	3	4	2	3	2	2		
038	1	4	3	3	2	1		
039	11	3	2	4	2	2		
040	11	3	3	2	2	2		
041	4	5	2	3	2	1		
042	5	4	2	2	2	1		
043	9	3	2	4	2	1		
044	1	4	2	6	2	2		
045	11	4	2	5	2	1		
046	3	4	2	2	2	2		
047	1	3	2	6	2	2		
048	2	OPEN						
049	1	4	2	2	2	2		
050	3	4	2	2	2	2		
051	6	4	4	7	2	2		
TEST DATE	2-24-77	3-11-77	5-4-77	5-27-77	6-14-77	6-29-77		
TEST BY	LTE	LTE	LTE	LTE	LTE	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 159 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 2 FIT
TEST NO. XT 1218-A	ENGR. D.K.
TEST TEMP. -55°C	Q.A.
TEST VOLT. 30 VDC	C.R.C. P/N M83421/01-1090 R
	CUST. P/N
	PROD. NO. 0236G
	P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles, -55°C to +125°C
(1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established limits for maximum leakage current @ -55°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	H.P. 425A	1480
I.R. test rack	CRC None	647
D.C. volt ohm meter	Simpson 260	1357
Temperature test chamber	Statham SD9-1	130
Thermometer	Marshall J E-485	1588
Battery pack	N/A	

INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	5	8	6	9	5	7		
022	5	8	8	7	5	4		
023	6	11	4	9	5	8		
024	4	12	5	11	5	11		
025	10	10	5	6	5	6		
026	3	12	4	11	7	11		
027	8	11	5	13	8	10		
029	4	9	5	11	7	7		
030	5	10	4	9	9	9		
031	7	9	5	9	7	8		
032	5	11	5	9	6	15		
033	4	11	8	13	5	21		
034	5	12	5	10	6	13		
035	5	6	6	11	7	10		
036	7	12	15	16	5	13		
TEST DATE	3-1-77	3-14-77	5-5-77	5-31-77	6-16-77	6-29-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	1/4 CRC	CPC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ -55°C (Terminal to Terminal)

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R
CUST P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C) Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	5	13	8	10	6	10		
038	3	13	5	9	8	9		
039	4	11	10	10	9	13		
040	4	18	5	11	6	16		
041	5	18	5	17	6	11		
042	6	8	10	7	35	25		
043	3	5	30	5	15	5		
044	2	10	10	8	12	12		
045	5	12	9	7	10	13		
046	3	7	5	10	6	7		
047	3	11	6	13	10	15		
048	2	OPEN						
049	4	10	3	10	9	11		
050	5	8	3	7	14	9		
051	6	7	4	7	8	9		
TEST DATE	3-1-77	3-14-77	5-5-77	5-31-77	6-16-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	J/S 380	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/N 704-35622 SHEET 161 OF 188

TEST: Insulation Resistance (Terminal to Terminal)	LAB SUPVR. CRC 2 FIT
TEST NO. XT 1218-A	ENGR. D.K.
TEST TEMP. 125°C	Q.A.
TEST VOLT. 18 VDC	

C.R.C. P/N M83421/01-1090 R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.7

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles, -55°C to +125°C
(1 hr. per cycle)

ACCEPTANCE LIMITS:
1500pA maximum or 12,000 megohms minimum
After 500 cycles air to air thermal shock there are no established limits for maximum leakage current @ +125°C

EQUIPMENT USED:

	Model No.	ECN No.
D.C. Micro V Ammeter	H.P. 425A	1480
I.R. Test rack	CRC None	647
D.C. volt ohm meter	Simpson 260	1357
Temperature test chamber	Statham SD9-1	130
Thermometer -	Marshall J E-485	1588
Battery pack	N/A	

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	21	4	38	20	18	10		
022	4	71	40	15	14	100		
023	27	6	50	14	24	18		
024	66	43	45	24	32	32		
025	24	6	65	33	14	120		
026	19	19	55	25	31	36		
027	4	19	45	37	47	31		
029	33	47	43	17	68	15		
030	25	4	40	15	10	10		
031	18	8	45	27	11	28		
032	16	50	60	14	25	11		
033	19	20	35	30	53	50		
034	29	22	45	20	29	29		
035	100	150	45	25	13	27		
036	69	15	43	50	25	28		
TEST DATE	2-28-77	3-14-77	5-6-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	LJ 260	CSC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Insulation Resistance @ 125°C (Terminal to Terminal)

TEST NO. XT 1218-A

C.R.C. P/N M83421/01-1090R
CUST P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

S/N	INSULATION RESISTANCE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial I.R.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	81	12	45	92	20	31		
038	85	12	45	35	21	27		
039	23	11	30	24	23	26		
040	4	6	30	23	60	240		
041	20	32	35	20	23	30		
042	15	30	35	18	13	53		
043	35	45	25	27	27	21		
044	19	73	35	15	10	33		
045	33	17	38	25	30	115		
046	21	85	30	35	32	40		
047	16	17	20	28	24	28		
048	17	OPEN						
049	11	36	30	43	34	15		
050	115	15	50	21	31	8		
051	33	17	180	45	8	32		
TEST DATE	2-28-71	3-14-71	5-6-71	5-31-71	6-16-71	6-28-71		
TEST BY	CRC F/T	CRC F/T	CRC F/T	J.J. OBD	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O 704-35622 SHEET 163 OF 188

TEST: Capacitance Drift with Thermal Shock
TEST NO. XT-1218-A
TEST TEMP. 25°C
TEST VOLT. N/A
LAB SUPV. F.I.T.
ENGR.
Q.A.

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles, -55°C to +125°C
(1 hr. per cycle)

ACCEPTANCE LIMITS:
.009uF to .011uF
After 500 cycles air to air thermal shock there are no established % capacitance drift limits for this test condition

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.009868	+.035	+.01	+.03	+.025	+.185		
022	.009780	-.02	-.1	-.095	-.185	-.215		
023	.009913	+.005	-.005	-.005	+.005	+.005		
024	.009976	0.00	-.04	-.155	-.17	-.205		
025	.009890	+.025	-.005	+.005	-.025	-.035		
026	.009930	-.005	-.015	-.005	+.02	+.045		
027	.009945	+.1	+.14	+.215	+.27	+.32		
029	.009936	0.00	-.025	+.095	+.87	+.89		
030	.009898	-.005	+.04	+.025	-.04	0.00		
031	.009800	+.015	-.03	-.065	-.11	-.14		
032	.009969	+.005	-.045	-.005	-.03	-.02		
033	.009839	-.005	0.00	+.015	+.055	-.03		
034	.009718	-.015	-.005	-.105	-.12	-.17		
035	.009803	+.045	-.045	-.11	-.13	-.17		
036	.009765	+.02	-.075	-.07	-.095	-.105		
TEST DATE	2-24-77	3-11-77	5-3-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	F/T CRC	F/T CRC	CRC F/T		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift with Thermal Shock

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	.009888	-.02	-.07	-.085	-.095	-.11		
038	.009877	+.045	+.035	+.085	-.01	+.04		
039	.009916	-.005	-.03	-.015	-.05	+.005		
040	.009634	-.01	-.015	-.015	-.125	-.14		
041	.010001	+.005	-.165	-.115	-.235	-.275		
042	.009866	+.005	-.055	-.09	-.14	-.19		
043	.009871	+.035	-.05	-.04	-.065	-.07		
044	.009880	+.025	-.025	-.01	+.015	+.175		
045	.009991	-.015	-.065	-.095	-.135	-.155		
046	.009937	+.005	-.055	-.095	-.15	-.255		
047	.009911	-.015	-.015	-.02	-.055	-.035		
048	.010173	OPEN						
049	.009947	+.01	-.045	-.035	-.055	-.09		
050	.009886	-.015	-.075	-.105	-.065	+.055		
051	.009845	-.005	-.035	0.00	-.065	-.12		
TEST DATE		2-24-77	3-11-77	5-3-77	5-27-77	6-14-77	6-29-77	
TEST BY		CRC FIT	CRC² FIT	CRC² FIT	CRC² FIT	CRC² FIT	CRC² FIT	

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR. CSC 23 FIT
TEST NO. XT-1218-A	ENGR. D.L.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Normal Thermal Shock per TP-1006 (Air to Air) 500 Cycles, -55°C to +125°C (1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established initial capacitance and % capacitance drift limits for this test condition

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber - Statham SD9-1		130
Thermometer - Marshall J E-485		1588

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.009696	+.105	+.13	+.185	-.165	-.19		
022	.009617	+.11	-.02	-.005	-.215	-.26		
023	.009748	+.11	+.135	+.52	+.045	-.035		
024	.009608	+.075	+.07	-.055	-.21	-.36		
025	.009734	+.08	+.035	+.045	-.12	-.205		
026	.009762	+.095	+.065	+.085	-.01	-.02		
027	.009770	+.005	+.13	+.36	+.25	+.31		
029	.009563	+.14	+.07	+.20	+.92	+.5		
030	.009732	+.165	+.195	+.155	+.115	-.035		
031	.009635	+.15	+.005	+.04	-.21	-.33		
032	.009592	+.125	+.09	+.24	+.085	-.005		
033	.009676	+.13	+.14	+.245	-.03	-.16		
034	.009545	+.035	+.025	+.125	-.135	-.89		
035	.009620	+.1	-.015	+.065	-.065	-.21		
036	.009627	+.075	+.025	+.025	-.145	-.95		
TEST DATE	3-17-77	3-14-77	5-5-77	5-31-77	6-16-77	6-27-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ -55°C with Thermal Shock

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap. in uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	.009719	+.09	+.065	+.085	-.08	-.185		
038	.009705	+.13	+.135	+.15	+.11	-.01		
039	.009745	+.125	+.02	+.055	-.075	-.38		
040	.009461	+.245	+.07	+.12	-.085	-.22		
041	.009834	+.47	-.05	-.11	-.22	-.45		
042	.009687	+.075	+.015	+.03	-.16	-.29		
043	.009906	+.15	+.03	+.085	-.04	-.14		
044	.009913	+.11	+.08	+.095	+.05	-.32		
045	.009820	+.095	+.015	-.025	-.13	-.3		
046	.009953	+.09	-.005	-.035	-.26	-.46		
047	.009941	+.075	-.155	+.15	-.12	-.44		
048								
049	.009986	+.09	-.015	+.065	-.085	-.18		
050	.009920	+.195	-.03	-.05	-.1	-.56		
051	.0096	+.39	+.01	-.015	-.18	-.33		
TEST DATE	3-1-77	3-14-77	5-5-77	5-31-77	6-17-77	6-27-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 167 OF 188

TEST: Capacitance Drift with Thermal Shock	LAB SUPVR.
TEST NO. XT-1218-A	ENGR.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090 R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.8

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles, -55°C to +125°C
(1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established initial capacitance and % capacitance drift limits for this test condition

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SD9-1	130
Thermometer -	Marshall J E-485	1588

PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial Cap in uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.009918	-.005	-.005	+.02	-.02	-.11		
022	.009808	+.01	-.015	-.03	-.09	-.26		
023	.009951	-.005	-.02	-.045	-.14	-.31		
024	.009833	-.025	-.045	-.115	-.165	-.36		
025	.009941	-.01	0.00	-.045	-.165	-.34		
026	.009919	0.00	-.055	-.115	-.085	-.16		
027	.009860	+.085	+.155	+.215	+.27	+.185		
029	.009767	-.005	+.04	+.53	+1.25	+.85		
030	.009943	-.015	+.035	-.08	-.13	-.225		
031	.009849	-.05	-.04	-.075	-.13	-.31		
032	.009830	-.025	-.055	-.095	-.11	-.26		
033	.009866	-.045	-.08	-.115	-.185	-.34		
034	.009779	-.025	-.045	-.11	-.135	-.36		
035	.009865	-.035	-.105	-.2	-.3	-.4		
036	.009829	-.02	-.05	-.13	-.17	-.225		
TEST DATE	2-28-77	3-14-77	5-6-77	5-31-77	6-16-77	6-26-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Capacitance Drift @ +125°C with Thermal Shock

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT CAPACITANCE CHANGE WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial Cap in uF	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
C37	.009932	±.015	±.05	±.06	±.07	±.19		
C38	.009929	±.015	±.025	±.055	±.015	±.13		
C39	.009945	±.01	±.015	±.05	±.16	±.31		
C40	.009687	±.055	±.065	±.085	±.16	±.24		
C41	.010023	±.075	±.075	±.09	±.115	±.39		
C42	.009895	±.005	±.02	±.015	-.11	±.3		
C43	.009919	±.005	0.00	±.015	±.095	±.24		
C44	.009920	±.025	±.055	±.04	±.045	±.175		
C45	.010006	±.01	±.03	±.06	±.015	±.09		
C46	.009954	±.005	±.004	±.015	±.115	±.28		
C47	.009938	±.01	±.07	±.29	±.3	±.16		
C48	.010246	OPEN						
C49	.009988	±.005	±.03	±.02	±.07	±.28		
C50	.009915	±.01	±.005	±.015	±.77	±.145		
C51	.009893	±.06	±.025	±.035	±.08	±.33		
TEST DATE	2-28-77	3-14-77	5-6-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 169 OF 188

TEST: Dissipation Factor @ 1KHz	LAB SUPVR. CRC 2 FIT	C.R.C. P/N M83421/01-1090R
TEST NO. XT-1218-A	ENGR.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO 0236G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles, -55°C to +125°C
(1 hr. per cycle)

ACCEPTANCE LIMITS:
15%
After 500 cycles air to air thermal shock there are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.08	.085	.085	.085	.08	.095		
022	.075	.085	.08	.095	.09	.095		
023	.075	.085	.08	.085	.085	.075		
024	.08	.085	.08	.095	.085	.1		
025	.075	.085	.075	.09	.085	.105		
026	.075	.085	.07	.085	.085	.085		
027	.075	.085	.085	.095	.095	.095		
029	.075	.08	.075	.085	.095	.095		
030	.08	.085	.085	.09	.095	.085		
031	.075	.085	.075	.09	.085	.095		
032	.075	.075	.075	.085	.085	.095		
033	.075	.08	.075	.085	.085	.09		
034	.075	.085	.075	.085	.095	.09		
035	.075	.075	.075	.08	.075	.075		
036	.065	.08	.075	.08	.075	.07		
TEST DATE	2-24-77	3-11-77	5-4-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ 25°C

C.R.C. P/N M83421/01-1090R
CUST P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

TEST NO. XT-1218-A

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	.075	.08	.075	.085	.085	.095		
038	.075	.075	.075	.085	.085	.08		
039	.075	.075	.075	.085	.09	.095		
040	.07	.08	.075	.09	.095	.105		
041	.065	.1	.075	.085	.085	.095		
042	.075	.085	.075	.085	.085	.095		
043	.07	.08	.08	.1	.08	.075		
044	.07	.075	.075	.08	.075	.085		
045	.07	.085	.075	.085	.095	.09		
046	.075	.085	.085	.1	.095	.105		
047	.07	.08	.075	.085	.08	.08		
048	.1	OPEN						
049	.075	.08	.08	.085	.085	.085		
050	.065	.08	.075	.08	.085	.085		
051	.075	.085	.075	.085	.095	.095		
TEST DATE	2-24-77	3-11-77	5-3-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 171 OF 188

TEST: Dissipation Factor @ 1KHz
LAB SUPVR. CRC FIT
ENGR.
Q.A.
TEST NO. Xt-1218-A
TEST TEMP. -55°C
TEST VOLT. N/A

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air)' 500 Cycles
-55°C to +125°C (1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SD9-1	130
Thermometer	Marshall J E-485	1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.39	.37	.38	.4	.44	.42		
022	.39	.38	.39	.4	.39	.39		
023	.39	.37	.39	.4	.39	.39		
024	.39	.38	.39	.4	.39	.39		
025	.39	.37	.39	.4	.38	.39		
026	.39	.38	.39	.41	.4	.41		
027	.41	.46	.46	.5	.46	.48		
029	.39	.37	.39	.59	.53	.42		
030	.4	.38	.42	.44	.38	.4		
031	.39	.37	.39	.4	.39	.39		
032	.39	.38	.39	.4	.39	.39		
033	.39	.38	.39	.4	.38	.39		
034	.4	.39	.4	.41	.39	.39		
035	.39	.38	.39	.4	.38	.39		
036	.38	.36	.38	.39	.38	.43		
TEST DATE	3-1-77	3-14-77	5-5-77	5-31-77	6-16-77	6-27-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ -55°C
TEST NO. XT-1218-A
C.R.C. P/N M83421/01-1090R
CUST P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F:	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	.39	.37	.39	.39	.38	.39		
038	.39	.38	.39	.4	.38	.39		
039	.39	.38	.39	.4	.39	.43		
040	.4	.38	.4	.4	.39	.39		
041	.39	.35	.44	.4	.39	.39		
042	.4	.39	.54	.41	.39	.39		
043	.39	.41	.39	.4	.4	.38		
044	.39	.4	.39	.4	.38	.46		
045	.39	.37	.39	.4	.39	.39		
046	.4	.39	.41	.42	.39	.4		
047	.39	.38	.52	.6	.53	.46		
048								
049	.4	.37	.39	.39	.38	.39		
050	.39	.36	.39	.4	.52	.47		
051	.4	.36	.4	.41	.39	.4		
TEST DATE	3-1-77	3-14-77	5-5-77	5-31-77	6-16-77	6-21-77		
TEST BY	CRC 2 FT	CRC 2 FT	CRC 2 FT	CRC 2 FT	CRC 2 FT	CRC 2 FT		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 173 OF 188

TEST: Dissipation Factor @ 1KHz	LAB SUPVR. CRC FIT
TEST NO. XT-1218-A	ENGR. D. K.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C (1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SD9-1	1588
Thermometer - Marshall J	E-485	1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.015	.015	.03	.025	.03	.035		
022	.015	.015	.02	.03	.04	.055		
023	.015	.015	.02	.025	.035	.03		
024	.015	.02	.025	.03	.035	.045		
025	.015	.02	.025	.035	.045	.075		
026	.015	.015	.02	.025	.03	.03		
027	.015	.02	.03	.025	.03	.035		
029	.015	.02	.035	.03	.05	.045		
030	.015	.02	.03	.035	.045	.035		
031	.015	.015	.02	.025	.035	.055		
032	.015	.015	.02	.025	.035	.045		
033	.015	.015	.02	.025	.035	.035		
034	.015	.02	.025	.025	.035	.035		
035	.015	.015	.015	.015	.02	.02		
036	.015	.015	.015	.02	.025	.025		
TEST DATE	2-28-77	3-14-77	5-6-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 1KHz @ 125°C

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	.015	.015	.025	.025	.035	.045		
038	.015	.03	.025	.025	.03	.04		
039	.015	.015	.03	.03	.035	.04		
040	.015	.02	.035	.035	.055	.095		
041	.015	.015	.025	.025	.035	.05		
042	.015	.015	.025	.03	.045	.07		
043	.015	.025	.02	.025	.03	.035		
044	.015	.015	.02	.025	.03	.03		
045	.015	.045	.02	.025	.035	.045		
046	.015	.025	.03	.045	.075	.095		
047	.015	.015	.015	.02	.03	.03		
048	.025	OPEN						
049	.015	.015	.02	.025	.025	.03		
050	.015	.015	.015	.02	.035	.03		
051	.02	.015	.02	.03	.045	.075		
TEST DATE	2-28-71	3-14-71	5-6-71	5-31-71	6-16-71	6-28-71		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 175 OF 188

TEST: Dissipation Factor @ 10KHz
TEST NO. XT-1218-A
TEST TEMP. 25°C
TEST VOLT. N/A
LAB SUPV. CRC 2 FIT
ENGR. O.K.
Q.A.

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C (1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1381

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.175	.19	.195	.18	.2	.34		
022	.165	.205	.21	.26	.26	.4		
023	.165	.185	.185	.205	.215	.235		
024	.19	.195	.21	.27	.25	.38		
025	.17	.165	.195	.25	.23	.37		
026	.17	.19	.18	.23	.25	.265		
027	.16	.18	.185	.205	.21	.215		
029	.17	.165	.215	.27	.3	.31		
030	.205	.225	.26	.34	.34	.33		
031	.17	.165	.185	.23	.24	.37		
032	.165	.145	.185	.215	.21	.3		
033	.165	.18	.185	.21	.21	.28		
034	.185	.205	.21	.225	.225	.32		
035	.155	.17	.175	.23	.185	.19		
036	.145	.165	.175	.185	.195	.22		
TEST DATE	2-24-77	3-11-77	5-3-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ 25°C

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090R
CUST P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	.165	.185	.165	.23	.27	.34		
038	.16	.165	.185	.2	.23	.26		
039	.17	.185	.195	.26	.28	.38		
040	.18	.205	.215	.265	.28	.49		
041	.155	.19	.195	.23	.24	.36		
042	.175	.195	.205	.25	.26	.33		
043	.165	.185	.195	.21	.215	.21		
044	.16	.18	.16	.21	.22	.3		
045	.165	.195	.2	.24	.265	.285		
046	.185	.21	.265	.35	.33	.49		
047	.155	.18	.18	.195	.185	.2		
048	.3	OPEN						
049	.155	.175	.18	.195	.21	.24		
050	.155	.175	.18	.2	.225	.22		
051	.165	.185	.2	.24	.26	.4		
TEST DATE	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		
TEST BY	2-24-77	3-11-77	5-3-77	5-27-77	6-14-77	6-29-77		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 177 OF 188

TEST: Dissipation Factor @ 10KHz	LAB SUPV.
TEST NO. XT-1218-A	ENGR.
TEST TEMP. -55°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C (1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber	Statham SD9-1	130
Thermometer - Marshall	J E-485	1588

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.49	.48	.49	.52	.55	.57		
022	.5	.5	.5	.54	.53	.51		
023	.49	.48	.49	.51	.58	.49		
024	.5	.5	.5	.52	.51	.5		
025	.49	.51	.49	.49	.48	.5		
026	.49	.52	.49	.52	.53	.54		
027	.49	.5	.51	.56	.54	.54		
029	.5	.49	.5	.66	.69	.63		
030	.53	.53	.56	.63	.61	.6		
031	.49	.5	.49	.52	.49	.51		
033	.49	.5	.49	.52	.55	.54		
033	.49	.51	.5	.53	.49	.5		
034	.51	.51	.51	.54	.51	.52		
035	.48	.49	.47	.5	.49	.48		
036	.47	.46	.46	.48	.51	.55		
TEST DATE	3-1-77	3-14-77	5-5-77	5-31-77	6-17-77	6-27-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ -55°C

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

TEST NO. XT-1218-A

P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)							
	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
037	.49	.49	.49	.52	.51	.52		
038	.48	.51	.48	.51	.5	.51		
039	.5	.52	.51	.55	.53	.6		
040	.52	.54	.53	.51	.51	.56		
041	.49	.5	.49	.5	.55	.52		
042	.5	.5	.54	.54	.49	.51		
043	.49	.55	.49	.51	.57	.47		
044	.49	.55	.51	.53	.5	.58		
045	.49	.5	.56	.52	.52	.52		
046	.52	.54	.53	.56	.53	.6		
047	.49	.49	.52	.61	.55	.55		
048								
049	.49	.49	.48	.5	.49	.5		
050	.48	.49	.49	.51	.57	.54		
051	.49	.5	.51	.52	.51	.55		
TEST DATE	3-1-77	3-14-77	5-5-77	5-31-77	6-16-77	6-27-77		
TEST BY	CRC² F/T	CRC² F/T	CRC² F/T	CRC² F/T	CRC² F/T	CRC² F/T		

F-634-2

COMPONENT RESEARCH CO., INC.

1655 - 26th Street · Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 179 OF 188

TEST: Dissipation Factor @ 10KHz	LAB SUPV. CRC F/T
TEST NO. XT-1218-A	ENGR.
TEST TEMP. 125°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION:
MIL-C-83421, Para. 4.7.9

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles, -55°C to +125°C
(1 hr. per cycle)

ACCEPTANCE LIMITS:
There are no established % D.F. limits for this test condition

EQUIPMENT USED:

	Model No.	ECN No.
Impedance comparator	G.R. 1654	1331
Precision decade capacitor	G.R. 1413	1387
Temperature test chamber - Statham SD9-1		130
Thermometer - Marshall J E-485		1588

PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C)

S/N	Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles		
021	.045	.06	.07	.095	.1	.18		
022	.055	.075	.095	.135	.135	.285		
023	.045	.055	.07	.08	.09	.145		
024	.065	.08	.13	.135	.13	.28		
025	.05	.065	.095	.155	.155	.32		
026	.055	.065	.075	.105	.11	.13		
027	.045	.06	.07	.075	.095	.095		
029	.065	.075	.11	.16	.16	.23		
030	.085	.115	.17	.195	.2	.2		
031	.055	.075	.075	.115	.125	.3		
032	.055	.055	.07	.105	.105	.195		
033	.055	.065	.085	.115	.115	.2		
034	.065	.085	.1	.125	.3	.22		
035	.035	.055	.055	.055	.075	.085		
036	.036	.045	.05	.055	.055	.14		
TEST DATE	2-28-77	3-14-77	5-6-77	5-31-77	6-16-77	6-28-77		
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street • Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Dissipation Factor @ 10KHz @ +125°C

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090 R
CUST P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

S/N	PERCENT DISSIPATION FACTOR WITH THERMAL SHOCK (-55°C to +125°C) Initial D.F.	After 20 Cycles	After 140 Cycles	After 260 Cycles	After 380 Cycles	After 500 Cycles
037	.075	.07	.09	.115	.11	.29
038	.04	.115	.065	.085	.09	.225
039	.06	.075	.105	.155	.15	.26
040	.075	.1	.13	.185	.185	.47
041	.045	.055	.085	.105	.14	.3
042	.065	.075	.105	.145	.14	.39
043	.063	.12	.06	.1	.105	.17
044	.055	.07	.075	.105	.125	.145
045	.055	.175	.095	.12	.125	.22
046	.07	.1	.16	.185	.22	.7
047	.045	.055	.065	.075	.09	.145
048	.08					
049	.045	.055	.065	.085	.09	.185
050	.055	.055	.065	.085	.095	.14
051	.055	.065	.1	.135	.14	.47
TEST DATE	2-28-77	3-14-77	5-5-77	5-31-77	6-16-77	6-28-77
TEST BY	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T	CRC F/T

F-634-2

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 181 OF 188

TEST: E.S.R	LAB SUPVR. CRC 23 FIT	C.R.C. P/N M83421/01-1090R
TEST NO. XT-1218-A	ENGR. D.K.	CUST. P/N
TEST TEMP. 25°C	Q.A.	PROD. NO. 0236G
TEST VOLT. N/A		P/O NO. NAS8-32403

SPECIFICATION:

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C, 1 hr. per cycle

ACCEPTANCE LIMITS:
There are no established E.S.R. limits for this test condition.

EQUIPMENT USED:

	Model No.	ECN No.
E.S.R. Meter - Clark-Hess	273	1130
Cable assembly -Clark-Hess	27375	1130

S/N	E.S.R. WITH THERMAL SHOCK (-55°C to +125°C) Initial E.S.R. Ω	After 20 Cycles Ω	After 140 Cycles Ω	After 360 Cycles Ω	After 380 Cycles Ω	After 500 Cycles Ω		
021	1.1	1.2	1.3	1.2	2.3	3.8		
022	1.3	1.5	1.7	2.4	3.1	4.5		
023	1.0	1.2	1.2	1.5	1.8	2.0		
024	1.4	1.4	1.7	2.6	2.5	5.5		
025	1.1	1.3	1.5	2.3	2.1	4.4		
026	1.1	1.2	1.4	1.8	2.4	2.4		
027	1.0	1.2	1.2	1.4	1.6	1.4		
029	1.3	1.5	1.9	2.6	3.4	3.3		
030	1.6	2.0	2.5	3.5	3.9	3.6		
031	1.1	1.3	1.4	2.0	2.8	4.4		
032	1.1	1.2	1.3	1.9	2.9	3.0		
033	1.2	1.3	1.4	2.0	2.1	2.6		
034	1.4	1.6	1.7	2.0	2.4	3.4		
035	1.0	1.1	1.0	1.2	1.4	1.3		
036	.9	1.0	1.0	1.3	1.5	2.2		
TEST DATE	2-25-77	3-10-77	5-4-77	5-27-77	6-14-77	6-29-77		
TEST BY	CRC 23 FIT	CRC 2 FIT	CRC FIT	CRC 2 FIT	CRC 2 FIT	CRC 2 FIT		

F-634-1

COMPONENT RESEARCH CO., INC.

1655 - 26th Street • Santa Monica, California 90404

Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: E.S.R. @ 25°C

TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090R

CUST P/N

PROD. NO. 0236G

P/O NO. NAS8-32403

S/N	E.S.R. WITH THERMAL SHOCK (-55°C to +125°C) Initial E.S.R. Ω	After 20 Cycles Ω	After 140 Cycles Ω	After 260 Cycles Ω	After 380 Cycles Ω	After 500 Cycles Ω		
037	1.2	1.4	1.6	2.3	2.7	3.8		
038	1.0	1.1	1.1	1.6	2.1	2.6		
039	1.3	1.4	1.7	2.9	3.3	4.2		
040	1.6	1.8	2.1	3.2	4.1	6.6		
041	1.0	1.2	1.4	2.3	2.4	3.7		
042	1.3	1.5	1.6	2.9	3.0	3.6		
043	1.2	1.3	1.4	1.8	1.9	1.7		
044	1.1	1.2	1.3	2.0	2.1	2.9		
045	1.2	1.4	1.6	2.3	2.8	2.9		
046	1.5	1.7	2.5	3.9	3.7	6.5		
047	1.0	1.2	1.2	1.5	1.4	1.3		
048	10.0	OPEN						
049	1.0	1.1	1.1	1.5	1.7	2.3		
050	1.1	1.2	1.2	1.7	1.9	1.9		
051	1.2	1.3	1.6	2.6	3.3	4.6		
TEST DATE	2-25-77	3-10-77	5-4-77	6-2-77	6-14-77	6-29-77		
TEST BY	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT	CRC FIT		

F-634-2

COMPONENT RESEARCH CO.,INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622 SHEET 183 OF 188

TEST: Seal Test (Fine Leak Test)	LAB SUPVR. CRC² FIT
TEST NO. XT-1218-A	ENGR.
TEST TEMP. 25°C	Q.A.
TEST VOLT. N/A	

C.R.C. P/N M83421/01-1090R
CUST. P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

SPECIFICATION: MIL-C-83421, Para. 4.7.5

SPECIAL NOTES:
Normal Thermal Shock per TP-1006
(Air to Air) 500 Cycles
-55°C to +125°C (1 hr. per cycle)

ACCEPTANCE LIMITS:
Leakage not to exceed 1 X 10^{-6} atm/cc/sec.

EQUIPMENT USED:

	Model No.	ECN No.
Fine leak detector	DuPont-24-120B	651

S/N	Initial		After 20 cycles		After 140 cycles		After 260 cycles		After 380 cycles		After 500 cycles		
	1X10^{-6}		1X10^{-6}		1X10^{-6}		1X10^{-6}		1X10^{-6}		1X10^{-6}		
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	
021	✓		✓		✓		✓		✓		✓		
022	↑		↑		↑		↑		↑		✓		
023												✓	
024											✓		
025											↓		
026													
027											↓		
029											✓		
030												✓	
031											✓		
032											↓		
033													
034													
035	↓		↓		↓		↓		↓		↓		
036	✓		✓		✓		✓		✓		✓		
TEST DATE	2-28-77		3-16-77		5-10-77		6-2-77		6-15-77		7-1-77		
TEST BY	CRC² FIT		CRC² FIT		CRC² FIT		CRC² FIT		CRC² FIT		CRC² FIT		

F-634-1

COMPONENT RESEARCH CO., INC.
1655 - 26th Street · Santa Monica, California 90404
Phone (213) 829-3615 TWX 910-343-6864

GENERAL DATA SHEET

Customer's Name: NASA S/O - 704-35622

TEST: Seal Test (Fine Leak Test)
TEST NO. XT-1218-A

C.R.C. P/N M83421/01-1090 R
CUST P/N
PROD. NO. 0236G
P/O NO. NAS8-32403

S/N	Initial 1X10^{-6}		After 20 hr 1X10^{-6}		After 140 hr 1X10^{-6}		After 260 hr 1X10^{-6}		After 380 hr 1X10^{-6}		After 500 hr 1X10^{-6}	
	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
037	✓		✓		✓		✓		✓		✓	
038	↓		↓		↓		↓		↓		↓	
039	↓		↓		↓		↓		↓		↓	
040	↓		↓		↓		↓		↓		↓	
041	↓		↓		↓		↓		↓		↓	
042	↓		↓		↓		↓		↓		↓	
043	↓		↓		↓		↓		↓		↓	
044	↓		↓		↓		↓		↓		↓	
045	↓		↓		↓		↓		↓		↓	
046	↓		↓		↓		↓		↓		↓	
047	↓		↓		↓		↓		↓		↓	
048	↓		↓		↓		↓		↓		↓	
049	↓		↓		↓		↓		↓		↓	
050	↓		↓		↓		↓		↓		↓	
051	✓		✓		✓		✓		✓		✓	
TEST DATE	2-28-77		3-16-77		5-10-77		6-2-77		6-15-77		7-1-77	
TEST BY	CRC FIT		CRC FIT		CRC FIT		CRC FIT		CRC FIT		CRC FIT	

F-634-2

VI. FAILURE ANALYSIS

Out of the one hundred fifty (150) capacitors subjected to 500 thermal shock cycles one (1) capacitor was cited as a failure. This capacitor (M83421/01-1090R serial no. 048) was found to have an initial Dissipation Factor measurement at 1 KHz of .1% @25°C. This measurement was within the limit of .15%, set forth in MIL-C-83421/1. An initial Dissipation Factor reading at 10 KHz @25°C, however, measured .3% and an initial Equivalent Series Resistance reading measured ten (10) ohms. These two initial readings revealed that the capacitor possessed terminations of poor quality. Due to a technician's error this unsuitable capacitor was not excluded from the test. The inclusion of this initially defective capacitor demonstrated that measuring Dissipation Factor of capacitors at 1 KHz is not a sufficient test when attempting to determine termination quality.

One capacitor (M83421/01-1186R serial no. 117) fell out of specification after twenty (20) cycles by exhibiting a low Insulation Resistance. Upon conclusion of the thermal shock testing, the capacitor was dissected for analysis. It was revealed that the capacitor had undergone excessive heating during induction soldering of the end seals to the case. This caused a melting of the polycarbonate film and subsequent weakening of the dielectric.

VII. CONCLUSIONS AND RECOMMENDATIONS

Subjecting metallized polycarbonate film capacitors to 500 thermal shock cycles, whether they be normal or accelerated cycles, is indeed a rigorous test procedure. Normally, capacitors of this type are expected to survive five (5) and sometimes ten (10) thermal shock cycles.

To ensure that capacitors are capable of withstanding shock cycling, proper screening methods must be used. Dissipation Factor and Equivalent Series Resistance measurements are taken to determine the quality of capacitor end terminations. Standard procedure as is specified in MIL-C-83421/1 is to take Dissipation Factor readings only at 1 KHz. The occurrence in this program of a capacitor which measured within specification at 1 KHz, but exhibited a poor Dissipation Factor at 10 KHz, and had a low Equivalent Series Resistance and which subsequently opened, demonstrates that Dissipation Factor readings at 1 Khz do not represent an adequate screening process.

In order to properly screen capacitors for thermal shock cycling all capacitors were one hundred (100%) percent tested for Equivalent Series Resistance. All capacitors were measured for Dissipation Factor at both one (1) and ten (10) KHz. A four terminal bridge system was used at high and low temperatures to compensate for test lead lengths present between environmental chambers and the impedance comparator.

For optimal capacitor performance under thermal shock stress it is recommended that the above testing method be instituted.

The results of this program demonstrate that by implementing certain design modifications the thermal properties of metallized polycarbonate film capacitors can be greatly improved. The success of this program has brought about the introduction of a capacitor which far exceeds present state-of-the-art capabilities.

VIII. ACKNOWLEDGMENTS

Mr. David Kellerman was instrumental in the design of this research project. He participated in supervising and establishing design solutions and testing criteria. Mr. John Conklin, as program manager at Component Research Co., organized all research and testing activities. Sylvia Fiacre supervised all documentation.

END

DATE

DCT 24, 1979

2-3