ET-89 (LWT-82)
SPACE SHUTTLE
ACCEPTANCE DATA PACKAGE
INDEX PAGE

80901010000-109 — PART NUMBER

00000082 — SERIAL NUMBER

[X] FLIGHT HARDWARE

[_] GROUND SUPPORT EQUIPMENT

DOCUMENTS INCLUDED IN THIS DATA PACKAGE

INCLUDED	NONE	SECTION	INDEX
[X]	[_]	I	DD FORM 250/1149
[X]	[_]	II	NOTES/COMMENTS

A. LO2/LH2 Umbilical Disconnect Data Package
B. Ball Fitting MRB Actions
C. Gas Sample Analysis, TP-5C101-AT
D. DD-250 MRB Listing
E. ET/Orbiter Alignment Data
F. Certificate of Verification for the Isopropyl Alcohol

COPY 2/18/03

INCLUDED	NONE	SECTION	INDEX
[X]	[_]	III	WAIVERS/DEVIATIONS
			A. List and Copies of Minor Waivers B. List and Copies of Deviation Approval Requests (if required)
[X]	[_]	IV	IDENTIFICATION -AS-BUILT CONFIGURATION
			A. Certificate of Configuration B. Serialization List (LRU) C. Hardware Readiness Statement
			NOTE: No Post DD-250 activity occurred
[X]	[_]	V	NON-STANDARD CALIBRATION DATA
			A. Liquid Level Sensor ICD Verification
[X]	[_]	VI	NONFLIGHT HARDWARE/TEMPORARY INSTALLATIONS

ACCEPTANCE DATA PACKAGE APPROVAL

Charmaine Nobles
CONTRACT/SUPPLIER

8 July 97
DATE

Cheryl J Osmond
NASA OR NASA DELEGATE

08 Jul 97
DATE

SPACE SHUTTLE PROGRAM

ACCEPTANCE
DATA PACKAGE

PART NAME	EXTERNAL TANK
PART NUMBER	80901010000-109
SERIAL NUMBER	0000082
MODEL NUMBER	ET-89 (LWT-82)
CONTRACT NUMBER	NAS8-36200
CONTRACTOR SUPPLIER	LOCKHEED MARTIN

SECTION I

This Section contains the official Quality Control copies of shipping documents for the deliverable hardware. (DD-250, DD-1149, etc.)

MATERIAL INSPECTION AND RECEIVING REPORT

Form Approved
OMB No. 0704-0248

Public reporting burden for this collection of information is estimated to average 35 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0248), Washington, DC 20503.
PLEASE DO NOT RETURN YOU COMPLETED FORM TO EITHER OF THESE ADDRESSES.
SEND THIS FORM IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THE DFARS, APPENDIX F-401.

1. DOC. INSTRUMENT IDEN. (CONTRACT)	(ORDER) NO.	6. INVOICE No. / DATE	7. PAGE	OF	8. ACCEPTANCE POINT
NAS8-36200			1	1	S

2. SHIPMENT NO.	3. DATE SHIPPED	4. B/L	5. DISCOUNT TERMS
MAF-4906	97 JUN 26 E	N/A TCN In House, Michoud Assembly Facility	N/A

9. PRIME CONTRACTOR CODE 10860

Lockheed Martin Manned Space Systems
Post Office Box 29304
New Orleans, LA 70189

10. ADMINISTERED BY CODE GP43

Procurement Office
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

11. SHIPPED FROM *(If other than 9)* CODE S FOB.

"See Block 9 "

12. PAYMENT WILL BE MADE BY CODE BF52

Financial Management Officer
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

13. SHIPPED TO CODE

Michoud Assembly Facility
National Aeronautics and Space Administration
New Orleans, Louisiana 70189
Attention: Mr. J.K. White, SA39

14. MARKED FOR CODE

For Contract NAS9-20000

15. ITEM NO.	16. STOCK/PART NO. DESCRIPTION (Indicate number of shipping containers - type of container - container number.)	17. QUANTITY SHIP / REC'D *	18. UNIT	19. UNIT PRICE	20. AMOUNT
Attach. J-5 (ET 89) See Note #1	P/N 80901010000-109 External Tank 89 DWG/DCN Level: FM S/N 0000082 CEI Spec. No.: CPT01M09A Part I Spec. SCN Level: 397 Part II Spec. SCN Level: 065	1	EA.	ESTIMATED COST	
	Acceptance Data Package for above ET.	1	EA.		
	NOTE: Ship Loose Hardware: Pack and Ship items that are part of the above Contract End Item will be DD250 Accepted via MIRR No. MAF4905				$47,900,000.00

21. CONTRACT QUALITY ASSURANCE

A. ORIGIN
☒ CQA ☒ ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

97 JUN 26 — Christopher T Reinecke CR70
DATE — SIGNATURE OF AUTH GOVT REP
TYPED NAME AND OFFICE: Christopher T. Reinecke, Safety & Mission Assurance Office

B. DESTINATION
☐ CQA ☐ ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

DATE — SIGNATURE OF AUTH GOVT REP
TYPED NAME AND OFFICE

22. RECEIVER'S USE
Quantities shown in column 17 were received in apparent good condition except as noted.

DATE RECEIVED — SIGNATURE OF AUTH GOVT REP
TYPED NAME AND OFFICE

** If quantity received by the Government is the same as quantity shipped, indicate by (√) mark, if different, enter actual quantity received below quantity shipped and encircle.*

23. CONTRACTOR USE ONLY

SHIPPING INSTRUCTIONS

BOX SIZES

PRESERVED FOR

WT | CUBE | PACKED BY

LEVEL OF PACK

ACC. NO.

REMARKS

Patricia R Powell 6/4/97
LOCKHEED MARTIN QUALITY — DATE

VOUCHER NO.

DISTRIBUTION:
MAF:
J. Connely, DCMC/RTTA (2)
J. Haggarty, DCMC/RTOA (2)
ne, 3713 (1)
, SA39 (1)
arez, 3641 (2)
D. Owens, 3720 (2)
T. Torregano, 2300 (2)

MSFC:
P. Counts, SA31 (1)
R. Woods, GP43 (2)
J. Adams, SA34 (1)

SHIPPING C. INER TALLY → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 1 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 7 48

REQUISITION AND INVOICE / SHIPPING DOCUMENT

Form Approved
OMB No. 0704-0246

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and ma intaining the data needed, and completing and reviewingthe collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarte rs Services, Directorate for information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0246), Washington, DC 20503.
PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSES. RETURN COMPLETED FORM TO THE ADDRESS IN ITEM 2

1. FROM: (*Include ZIP Code*)
Lockheed Martin Manned Space Systems
13800 Old Gentilly Road
Michoud Assembly Facility
New Orleans, La. 70189

2. TO: (*Include ZIP Code*)
United Space Alliance
Shuttle Warehouse, Building K6-1547
Kennedy Space Center, FL. 32899

3. SHIP TO - MARK FOR
United Space Alliance
Shuttle Warehouse, Building K6-1547
Kennedy Space Center, FL. 32899
NAS9-20000

SHEET NO.	NO. OF SHEETS	5. REQUISITION DATE	6. REQUISITION NUMBER
1	1	97JUL01	NAS8-36200

7. DATE MATERIEL REQUIRED (YYMMDD): 97 JUL 7 E

8. PRIORITY: C-1

9. AUTHORITY OR PURPOSE: TRANSFER ACCOUNTABILITY TO SFOC NAS9-20000 97/OD/0337

10. SIGNATURE: Jacelyn R. Connelly 7-9-97

11a. VOUCHER NUMBER AND DATE (YYMMDD)

12. DATE SHIPPED (YYMMDD)

b. 7181-3028

13. MODE OF SHIPMENT

14. BILL OF LADING NUMBER

15. AIR MOVEMENT DESIGNATOR OR PORT REFERENCE NO.: N/A

4. APPROPRIATIONS SYMBOL AND SUBHEAD	OBJECT CLASS	EXPENDITURE ACCOUNT (From)	EXPENDITURE ACCOUNT (To)	CHARGEABLE ACTIVITY	BUREAU CONTROL ACTIVITY NO.	BUREAU CONTROL NO.	AMOUNT
453610-75890-30000-00000-3800	N/A	N/A	N/A	N/A	N/A	N/A	N/A

ITEM NO. (a)	FEDERAL STOCK NUMBER, DESCRIPTION, AND CODING OF MATERIEL AND/OR SERVICES (b)	UNIT OF ISSUE (c)	QUANTITY REQUESTED (d)	SUPPLY ACTION (e)	TYPE CONTAINER (f)	CONTAINER NOS. (g)	UNIT PRICE (h)	TOTAL COST (i)
01	External Tank S/N0000082 P/N80901010000-109							
02	External Tank ET-89CEI: SPEC. No. T01M09A Acceptance Data Package for above CEI . Consists of_____Boxes.	EA	1	1			N/A	N/A
03	SHIPLOOSE HARDWARE for ET-89, LWT-82, CEI as above	ST	1	1			N/A	N/A
		LT	1	1			N/A	N/A
			(Consist of 6 Boxes)					
	Received at MAF by:_____ USA/SFOC							Estimated Total Cost from DD250: 47.9M
	Received at KSC by:_____ USA/Logistics							

16. TRANSPORTATION VIA MATS OR MSTS CHARGEABLE TO

17. SPECIAL HANDLING

18. REFERENCE SHIPMENT INSTRUCTION

ISSUED BY	TOTAL CONTAINERS	TYPE CONTAINER	DESCRIPTION	TOTAL WEIGHT	TOTAL CUBE
M.J. ALVAREZ					
CHECKED BY					
PACKED BY			TOTAL		

19. RECEIPT

CONTAINERS RECEIVED EXCEPT AS NOTED	DATE (YYMMDD)	BY	SHEET TOTAL
QUANTITIES RECEIVED EXCEPT AS NOTED	DATE (YYMMDD)	BY	GRAND TOTAL
POSTED	DATE (YYMMDD)	BY	20. RECEIVER'S VOUCHER NO.

51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

DD Form 1149, JAN 93

PREVIOUS EDITIONS MAY BE USED

SHIPPING CONTAINER TALLY → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

REQUISITION AND INVOICE / SHIPPING DOCUMENT

Form Approved
OMB No. 0704-0[illegible]

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PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSES. RETURN COMPLETED FORM TO THE ADDRESS IN ITEM 2

1. FROM: (*Include ZIP Code*)
National Aeronautics and Space Administration
Michoud Assembly Facility, New Orleans, La. 70189

SHEET NO.	NO. OF SHEETS	5. REQUISITION DATE	6. REQUISITION NUMBER
1	1	97 JUN 25	NAS8-36200

7. DATE MATERIEL REQUIRED (YYMMDD): 97 JUN 26 E

8. PRIORITY: #1

2. TO: (*Include ZIP Code*)
Lockheed Martin Manned Space Systems
13800 Old Gentilly Road
Michoud Assembly Facility
New Orleans, La. 70189

9. AUTHORITY OR PURPOSE
Government Property Accountability Transfer of ET-89 to Lockheed Martin (Ref 96/OD/0283)

10. SIGNATURE D. Barrett 6/25/97

11a. VOUCHER NUMBER AND DATE (YYMMDD)

3. SHIP TO - MARK FOR
Michoud Assembly Facility
13800 Old Gentilly Road
New Orleans, La. 70189

Lockheed Martin Manned Space Systems

12. DATE SHIPPED (YYMMDD): N/A, Documentation only

b. 7156-3026

13. MODE OF SHIPMENT: In-House, Michoud

14. BILL OF LADING NUMBER: N/A

15. AIR MOVEMENT DESIGNATOR OR PORT REFERENCE NO.: N/A

4. APPROPRIATIONS SYMBOL AND SUBHEAD	OBJECT CLASS	EXPENDITURE ACCOUNT (From)	EXPENDITURE ACCOUNT (To)	CHARGEABLE ACTIVITY	BUREAU CONTROL ACTIVITY NO.	BUREAU CONTROL NO.	AMOUNT
453610-75890-30000-00000-3800	N/A	N/A	N/A	N/A	N/A	N/A	N/A

ITEM NO. (a)	FEDERAL STOCK NUMBER, DESCRIPTION, AND CODING OF MATERIEL AND/OR SERVICES (b)	UNIT OF ISSUE (c)	QUANTITY REQUESTED (d)	SUPPLY ACTION (e)	TYPE CONTAINER (f)	CONTAINER NOS. (g)	UNIT PRICE (h)	TOTAL COST (i)
1	External Tank S/N0000082 P/N80901010000-109 ET-89 CEI: T01M09A MAF4906	Ea.	1	N/A	N/A	N/A	N/A	Estimated Cost: $47,900,000.00
2	Acceptance Data Package for above CEI (To remain in MAF Data Retention Center pending ET shipment)	N/A	N/A	N/A	N/A	N/A	N/A	

Received at MAF by: _____
M.J. Alvarez

16. TRANSPORTATION VIA MATS OR MSTS CHARGEABLE TO

17. SPECIAL HANDLING

18. NOTE AS PRACTICABLE

ISSUED BY	TOTAL CONTAINERS	TYPE CONTAINER	DESCRIPTION	TOTAL WEIGHT	TOTAL CUBE
H.E. Traylor			All items listed on DDForm250 #MAF4906		
CHECKED BY D. L. Owens					
PACKED BY					
			TOTAL		

19. RECEIPT

CONTAINERS RECEIVED EXCEPT AS NOTED	DATE (YYMMDD)	BY	SHEET TOTAL
QUANTITIES RECEIVED EXCEPT AS NOTED	DATE (YYMMDD)	BY	GRAND TOTAL
POSTED	DATE (YYMMDD)	BY	20. RECEIVER'S VOUCHER NO.

DD Form 1149, JAN 93

51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

PREVIOUS EDITIONS MAY BE USED

MATERIAL INSPECTION AND RECEIVING REPORT

Form Approved
OMB No. 0704-0248

Public reporting burden for this collection of information is estimated to average 35 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0248), Washington, DC 20503.

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SEND THIS FORM IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THE DFARS, APPENDIX F-401.

1. DOC. INSTRUMENT IDEN. (CONTRACT)	(ORDER) NO.	6. INVOICE No. / DATE	7. PAGE	OF	8. ACCEPTANCE POINT
NAS8-36200			1	2	S

2. SHIPMENT NO.	3. DATE SHIPPED	4. B/L	5. DISCOUNT TERMS
MAF-4905	97 JUN 13 E	N/A TCN In-House Michoud Assembly Facility	N/A

9. PRIME CONTRACTOR CODE 10860

Lockheed Martin Manned Space Systems
Post Office Box 29304
New Orleans, LA 70189

10. ADMINISTERED BY CODE GP43

Procurement Office
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

11. SHIPPED FROM *(If other than 9)* CODE S FOB.

"See Block 9 "

12. PAYMENT WILL BE MADE BY CODE BF52

Financial Management Officer
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

13. SHIPPED TO CODE

Michoud Assembly Facility
National Aeronautics and Space Administration
New Orleans, Louisiana 70189
Attention: Mr. J.K. White, SA39

14. MARKED FOR CODE

For Contract NAS9-20000

15. ITEM NO.	16. STOCK/PART NO. (Indicate number of shipping containers - type of container - container number.) DESCRIPTION	17. QUANTITY SHIP / REC'D *	18. UNIT	19. UNIT PRICE	20. AMOUNT
Attach J-5 (ET-89) See Note #1	Ship Loose Hardware for ET-89 S/N 0000082 Consisting of the Following				
	P/N 80911009100-009 Bolt Absorber Assy	1	EA	Estimated Cost for these items is included in the Total Amount reported on MIRR No. MAF-4906, Block No. 20 for DD250 of ET-89.	
	P/N 80911009101-089 Bolt Catcher Assy	2	EA		
	P/N 80911009101-090 Bolt Catcher Assy	2	EA		
	P/N 80911009117-009 Gnd Jumper Kit	1	EA		
	P/N 80911009130-139 Attach Hardware Kit	2	EA		
	(CONTINUED)				

21. CONTRACT QUALITY ASSURANCE

A. ORIGIN
☑ CQA ☑ ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

6/10/97 James T. Hawkins
DATE SIGNATURE OF AUTH GOVT REP
James T. Hawkins
NASA/MSFC/CR70
TYPED NAME AND OFFICE Safety & Mission Assurance Office

B. DESTINATION
☐ CQA ☐ ACCEPTANCE of listed items has been made by me or under my supervision and they conform to contract, except as noted herein or on supporting documents.

DATE SIGNATURE OF AUTH GOVT REP
TYPED NAME AND OFFICE

22. RECEIVER'S USE
Quantities shown in column 17 were received in apparent good condition except as noted.

DATE RECEIVED SIGNATURE OF AUTH GOVT REP
TYPED NAME AND OFFICE

** If quantity received by the Government is the same as quantity shipped, indicate by (√) mark, if different, enter actual quantity received below quantity shipped and encircle.*

23. CONTRACTOR USE ONLY

SHIPPING INSTRUCTIONS

BOX SIZES: 6 WOODEN BOXES

PRESERVED FOR

WT | CUBE | PACKED BY

LEVEL OF PACK

ACC. NO. 453610-75890-30000-45-00000-3800

REMARKS

Charles J. Malone 6-12-97
LOCKHEED MARTIN QUALITY DATE

VOUCHER NO. 3P41710

DISTRIBUTION:
MAF:
J. Connely, DCMDS/RNAA (2)
J. Haggarty, DPRO/RNQA (2)
[illegible] 3713 (1)
[illegible] SA39 (1)
[illegible] 3641 (2)
D. Owens, 3720 (2)
T. Torregano, 2300 (2)

MSFC:
P. Counts, SA31 (1)
R. Woods, GP43 (2)
J. Adams, SA34 (1)

MATERIAL INSPECTION AND RECEIVING REPORT

SHIPMENT NO.	DATE SHIPPED	PROC. INSTRUMENT IDEN. (CONTRACT)	(ORDER) NO.	INVOICE NO.
MAF-4905	97 JUN 13 E	NAS8-36200		

ITEM NO	STOCK/PART NO DESCRIPTION (Indicate number of shipping containers - type of container - container number)	QUANTITY SHIP / REC'D *	UNIT	UNIT PRICE	AMOUNT
	P/N 80911009130-160 ET/SRB Fairing, AFT	1	EA		
	P/N 80911009130-169 ET/SRB Fairing, AFT	1	EA		
	P/N 80911009190-050 Bipod Installation Hdw	1	EA		
	P/N 80911009190-099 Yoke Assy	1	EA		
	P/N 80911009190-100 Spherical Washer	1	EA		
	P/N 80911009190-129 Bipod Strut Assy Adjustable	1	EA		
	P/N 80911009190-130 Bipod Strut Assy Non Adjustable	1	EA		
	P/N 80911009319-019 ET/SRB Fairing & Hardware Assy Kit	1	EA		
	P/N 80911009319-020 ET/SRB Fairing &Hardware Assy Kit	1	EA		
	P/N 80911009320-009 Access Door Hardware Kit	1	EA		
	P/N 80931009009-130 Aft SRB Instl. Hardware Kit	1	EA		

NOTE:

1. The above listed hardware is part of Contract NAS8-36200, Attachment J-5, External Tank 89 (S/N 0000082). ET-89, itself, and its Acceptance Data Package will be accepted by DD250 via MIRR No. MAF-4906.

2. All Rotational Support Equipment/Tools which support the transportation of Ship Loose Hardware or the ET to a launch site, shall be returned to Lockheed Martin Manned Space Systems for reuse/control.

SECTION II

This Section contains miscellaneous data which does not fit into any other section and would be of benefit to the receiving agency.

Included in this section is copies of LO2/LH2 Umbilical Disconnect MARS/MRB Actions and related Waivers/Deviations, Gas Sample Analysis.

The +Y and -Y Ball Fittings (80911071764-019 and 80911071763-019) will be included when applicable.

Included herein is a listing of all MRBs associated to the ET at time of delivery, and the ET/Orbiter alignment data.

Also in this section is the Certificate of Verification for the Isopropyl Alcohol.

LO2/LH2 UMBILICAL DISCONNECTS
ASSEMBLY DATA PACKS

1. MRB'S
2. FLAPPER ANGLE ADJUSTMENT

(UNDER SEPARATE COVER)

BALL FITTING MRB ACTIONS

N007903

N007916

GAS SAMPLE ANALYSIS

1. TP-5C101-AT

CRITICAL/LIMITED LIFE COMPONENT

ACCEPTANCE TEST PROCEDURE

TP-5C101-AT

TITLE: PRESSURE CONTROL AND MONITOR SYSTEM VERIFICATION

PROCEDURE VALIDATED:	YES		
HAZARDOUS OPERATIONS:	YES	PCN:	E9
CIL INSPECTIONS:	NO	OPTION:	2
GIA MANDATORY:	YES	EFFECTIVITY:	ET 84 & SUBS

GIA REVIEW: R. DEBLASIO, ENGR. (5-9-97) QE PCN APPROVAL: <Q37P> 05-09-97

/ / / / / / / / / / / / / / / / / / / /
/ EMERGENCY PROCEDURES: APPENDIX Z /
/ / / / / / / / / / / / / / / / / / / /

SCOPE

THIS PROCEDURE PROVIDES THE INSTRUCTIONS TO PERFORM A CHECKOUT OF THE BUILDING 420 PRESSURE CONTROL AND MONITOR SYSTEM AND SUPPORT EQUIPMENT OF CELL 1 & 2. COMPLETION OF THIS PROCEDURE WILL ENSURE THE READINESS OF THE PRESSURE CONTROL AND MONITOR SYSTEM TO SUPPORT FINAL CHECKOUT OF THE ET PROPULSION AND PRESSURIZATION SYSTEMS. SATISFACTORY COMPLETION OF THIS TEST WILL MEET THE FOLLOWING REQUIREMENTS OF MMC-ET-TM04k-B ACCEPTANCE REQUIREMENTS:

FLUID CONTAMINATION CONTROL - MMC-ET-TM04k-B, PARA. 2.1.6.2.

NOTE: TP-13H150-AT ILLUSTRATIONS MUST BE USED WITH THIS PROCEDURE.

OFFICIAL RELEASE TP-5C101-AT
OFFICIAL TEST COPY MS 308 MAY 13 '97
LOT-082
ONE
DATE MAY 13 '97
PCN E-9 ATTACHED NONE
LIST NO. 564520

OPERATIONS

STEP	LOCATION/OPERATION/ACTION	VERIF

NOTE: THE FOLLOWING STEP WILL REMAIN OPEN UNTIL AN ACCEPTABLE GAS SAMPLE LAB REPORT IS OBTAINED.

*8.3 PC GAS SAMPLE LAB REPORT:

A) VERIFY SAMPLE MEETS THE FOLLOWING REQUIREMENTS [REF. ET-MMC-TM04k-B PARAS. 2.1.6.2]:

PARTICLE SIZE:		
LARGER THAN 100 MICRONS	[LIMIT:	0 PER 30 SCF]
30 TO 100 MICRONS	[LIMIT:	25 MAXIMUM PER 30 SCF]
MOISTURE CONTENT	[LIMIT:	24 PPM MAXIMUM]
HYDROCARBON CONTENT	[LIMIT:	5 PPM MAXIMUM]

B) WHEN GAS SAMPLE IS NOT ACCEPTABLE, REPEAT STEPS 8.1 THRU *8.3 AS REQUIRED TO OBTAIN AN ACCEPTABLE GAS SAMPLE.

C) ATTACH A COPY OF ACCEPTABLE LAB REPORT TO TEST PROCEDURE.

RECORD LAB TICKET NUMBER: 06781

M 822730 05-15-97
Q MSS 273 05-15-97
G 3115 5/15/97

8.4 NC HELIUM INJECT QD:

REMOVE F78-1225-1-116 FLEX HOSE CAP. M 822730A 05-15-97

8.5 NC SPP [FIG. 9.5]:

A) OPEN [CCW] HV-32.

B) PURGE FOR ONE MINUTE [MINIMUM], THEN CLOSE [CW] HV-32. M 05-15-97

OPERATIONS

STEP	LOCATION/OPERATION/ACTION	VERIF
12.5 NC	ECP [FIG. 9.1]:	
	AFTER SAMPLE HAS BEEN OBTAINED, SET PILOT VALVE CHECKOUT SWITCH S5 TO CLOSED.	82273A M 05-15-97
12.6 NC	F78-1399 [FIG. 9.37] [REF. 1.7]:	
A)	VERIFY GAS FLOW AT F78-1399-1-105 HOSE OUTLET HAS STOPPED.	
B)	CLOSE [CCW] REGULATOR VALVE TO VENT TO 0 PSIG [NOMINAL] ON REGULATED PRESSURE GAUGE 1. THEN CLOSE [CW] PURGE VALVE AND METER VALVE 1.	
C)	DISCONNECT GAS SAMPLER FROM F78-1399-1-105 HOSE AND INSTALL REMAINING PLUG ON HOSE OUTLET.	82273A M 05-15-97
	NOTE: THE FOLLOWING STEP WILL REMAIN OPEN UNTIL AN ACCEPTABLE GAS SAMPLE LAB REPORT IS OBTAINED.	
*12.7 PC	GAS SAMPLE LAB REPORT:	
A)	VERIFY SAMPLE MEETS THE FOLLOWING REQUIREMENTS [REF. ET-MMC-TM04k-B PARAS. 2.1.6.2]:	

PARTICLE SIZE:		
LARGER THAN 100 MICRONS	[LIMIT:	0 PER 30 SCF]
30 TO 100 MICRONS	[LIMIT:	25 MAXIMUM PER 30 SCF]
MOISTURE CONTENT	[LIMIT:	24 PPM MAXIMUM]
HYDROCARBON CONTENT	[LIMIT:	5 PPM MAXIMUM]

B) WHEN GAS SAMPLE IS NOT ACCEPTABLE, REPEAT SECTIONS 10.0, 11.0, AND STEPS 12.3 THRU *12.7 AS REQUIRED TO OBTAIN AN ACCEPTABLE GAS SAMPLE.

C) ATTACH A COPY OF ACCEPTABLE LAB REPORT TO TEST PROCEDURE.

RECORD LAB TICKET NUMBER: 06783

82273A M 05-16-97
MSS 273 Q
G 5-16-97

OPERATIONS

STEP	LOCATION/OPERATION/ACTION	VERIF

NOTE: THE FOLLOWING STEP WILL REMAIN OPEN UNTIL AN ACCEPTABLE GAS SAMPLE LAB REPORT IS OBTAINED.

*14.5 PC GAS SAMPLE LAB REPORT:

A) VERIFY SAMPLE MEETS THE FOLLOWING REQUIREMENTS [REF. ET-MMC-TM04k-B PARAS. 2.1.6.2]:

PARTICLE SIZE:		
LARGER THAN 100 MICRONS	[LIMIT:	0 PER 30 SCF]
30 TO 100 MICRONS	[LIMIT:	25 MAXIMUM PER 30 SCF]
MOISTURE CONTENT	[LIMIT:	24 PPM MAXIMUM]
HYDROCARBON CONTENT	[LIMIT:	5 PPM MAXIMUM]

B) WHEN GAS SAMPLE IS NOT ACCEPTABLE, REPEAT SECTION 13.0 AND STEPS 14.1 THRU *14.5 AS REQUIRED TO OBTAIN AN ACCEPTABLE GAS SAMPLE.

C) ATTACH A COPY OF ACCEPTABLE LAB REPORT TO TEST PROCEDURE.

RECORD LAB TICKET NUMBER: 06778

M 82273A 05-15-97
Q MSS 273 05-15-97
G C A 3115 5/15/97

14.6 BC LO2 AFT UMBILICAL [REF. 1.7]:

A) VERIFY 96 HOURS HAS NOT ELAPSED BETWEEN OBTAINING GAS SAMPLE AND CONNECTING TO ET.

B) REMOVE LO2 TANK PRESSURIZATION QD FITTING CAP.

C) VERIFY/REMOVE ANY ADAPTERS USED FOR OBTAINING GAS SAMPLE FROM F78-1489 INTERFACE FILTER ASSEMBLY.

D) CONNECT F78-1489 INTERFACE FILTER ASSEMBLY/F78-1225-1-111 LO2 PRESSURIZATION HOSE TO LO2 AFT UMBILICAL PRESSURIZATION QD FITTING. SNUG +1/6 TURN.

M 82273A 05-15-97
Q MSS 273 05-15-97

OPERATIONS

STEP	LOCATION/OPERATION/ACTION	VERIF
15.4 BC	MAINTAIN CLEANLINESS BY INSTALLING A CAP OR PLUG ON ADAPTERS CONNECTED TO F78-1489 INTERFACE FILTER ASSEMBLY [REF. 1.7].	M 82553A 5/14/ Q MSS 707 5/14/

Entered in ERROR 5-16-97 MSS

NOTE: THE FOLLOWING STEP WILL REMAIN OPEN UNTIL AN ACCEPTABLE GAS SAMPLE LAB REPORT IS OBTAINED.

*15.5 PC GAS SAMPLE LAB REPORT:

A) VERIFY SAMPLE MEETS THE FOLLOWING REQUIREMENTS [REF. ET-MMC-TM04k-B PARAS. 2.1.6.2]:

PARTICLE SIZE:		
LARGER THAN 100 MICRONS	[LIMIT:	0 PER 30 SCF]
30 TO 100 MICRONS	[LIMIT:	25 MAXIMUM PER 30 SCF]
MOISTURE CONTENT	[LIMIT:	24 PPM MAXIMUM]
HYDROCARBON CONTENT	[LIMIT:	5 PPM MAXIMUM]

B) WHEN GAS SAMPLE IS NOT ACCEPTABLE, REPEAT SECTION 13.0 AND STEPS 15.1 THRU *15.5 AS REQUIRED TO OBTAIN AN ACCEPTABLE GAS SAMPLE.

C) ATTACH A COPY OF ACCEPTABLE LAB REPORT TO TEST PROCEDURE.

RECORD LAB TICKET NUMBER: 06777

82273A M 05-15-97 Q MSS 273 5/15/97 G 3115 5/15/97

LIMS # 70001487

BLDG 420, CELL 2
7-3508 LWT-82
BLDG. 420

CONTAMINATION MEASUREMENT REPORT

1 05-14-97	PART NO. 2 F78-2125-1-112		LIST NO. 06777
NO. 3 N/A	DR NO. 4 N/A	5 ☐ ET ☒ GSE ☐ STE ☐ OTHER	CRITICAL SURFACE AREA (Sq. Ft.) N/A
NOMENCLATURE 7 LH^2 PRESSURIZATION FLEXHOSE			DOCUMENT/MPP LIST NO. TP-5C101-AT
SERIAL NO. 9 UNIT 1	P.O. NO. 10 N/A	AREA 11 ☐ FINAL CLEAN ☐ PRE-CLEAN ☐ PNEUMATIC ☑ OTHE	

SAMPLE 12				CHECK FOR 1			
	TRICH		H_2O	✓	PARTICULATE	✓	HYDROCARBON
✓	GN_2		AIR		.N.V.R.		pH
	FREON				CONCENTRATION	✓	~~DEWPOINT~~ MOISTURE
	ENVIRONMENT				CONDUCTIVITY		

USED ON 14
☐ PNEUMATICS ☑ HYDROGEN ☐ OXYGEN ☐ OTHER

CLEANING SPEC. 15 N/A

REVISION 16 N/A

INSPECTION STAMP & DATE 17	SAMPLE NO. 1 18	SAMPLE NO. 2 18	SAMPLE NO. 3 18	CUSTOMER STAMP & DATE 19	SAMPLE NO. 1 20	SAMPLE NO. 2 20	SAMPLE NO. 3 20
MSS 198 5/14/97	ACCEPTED						

ANALYSIS RESULTS

PARTICULATE COUNT PER ~~Sq. Ft.~~ 21 SAMPLE NO. 1 0 (30-100μ); 0 >100μ	N.V.R. (GM/FT2) 22	HYDROCARBON CONTENT (P.P.M.) 23 LESS THAN 1 PPM
PARTICULATE COUNT PER Sq. Ft. SAMPLE NO. 2	N.V.R. (GM/FT2)	HYDROCARBON CONTENT (P.P.M.)
PARTICULATE COUNT PER Sq. Ft. SAMPLE NO. 3	N.V.R. (GM/FT2)	HYDROCARBON CONTENT (P.P.M.)
CONCENTRATION (Oz/Gal.) 24	CONDUCTIVITY (OHMS) 25	~~pH~~ MOISTURE 26 1.2 PPM

REMARKS 27

PARTICLE SIZE:
LARGER THAN 100 MICRONS [LIMIT: Ø PER 30 SCF]
30 TO 100 MICRONS [LIMIT: 25 MAXIMUM PER 30 SCF]

MOISTURE CONTENT: [LIMIT: 24 PPM MAXIMUM]

HYDROCARBON CONTENT: [LIMIT: 5 PPM MAXIMUM]

TEST PROCEDURE # TP-5C101-AT
ATTACHMENT # 3
PAGE 1 of 1

Acceptable

TECHNOLOGY LAB 28	DATE 29	CUSTOMER STAMP 30	DATE 31
29296	05/14/97		

LIMS # 70001488

BLDG 420, CELL 2
7-3508 LWT-82
BLDG. 420

CONTAMINATION MEASUREMENT REPORT

1 05-14-97	2 PART NO. F78-1225-1-111		2 LIST NO. 06778
3 NO. N/A	4 DR NO. N/A	5 ☐ ET ☒ GSE ☐ STE ☐ OTHER	6 CRITICAL SURFACE AREA (Sq. Ft.) N/A
7 NOMENCLATURE LO² PRESSURIZATION FLEXHOSE			8 DOCUMENT/MPP LIST NO. TP-5C101-AT
9 SERIAL NO. UNIT 1	10 P.O. NO. N/A		11 AREA ☐ FINAL CLEAN ☐ PRE-CLEAN ☐ PNEUMATIC ☑ OTHER

12 SAMPLE				13 CHECK FOR			
	TRICH		H_2O	✓	PARTICULATE	✓	HYDROCARBON
✓	GN_2		AIR		N.V.R.		pH
	FREON				CONCENTRATION	✓	~~DEWPOINT~~ MOISTURE
	ENVIRONMENT				CONDUCTIVITY		

14 USED ON	15 CLEANING SPEC.	16 REVISION
☐ PNEUMATICS ☐ HYDROGEN ☑ OXYGEN ☐ OTHER	N/A	N/A

17 INSPECTION STAMP & DATE	18 SAMPLE NO. 1	18 SAMPLE NO. 2	18 SAMPLE NO. 3	19 CUSTOMER STAMP & DATE	20 SAMPLE NO. 1	20 SAMPLE NO. 2	20 SAMPLE NO. 3
5/14/97	ACCEPTED						

ANALYSIS RESULTS

PARTICULATE COUNT PER ~~Sq. Ft.~~ 30SCF 21 SAMPLE NO. 1 0 (30-100μ); 0 > 100μ	N.V.R. (GM/FT2) 22	HYDROCARBON CONTENT (P.P.M.) 23 LESS THAN 1 PPM
PARTICULATE COUNT PER Sq. Ft. SAMPLE NO. 2	N.V.R. (GM/FT2)	HYDROCARBON CONTENT (P.P.M.)
PARTICULATE COUNT PER Sq. Ft. SAMPLE NO. 3	N.V.R. (GM/FT2)	HYDROCARBON CONTENT (P.P.M.)
CONCENTRATION (Oz/Gal.) 24	CONDUCTIVITY (OHMS) 25	~~pH~~ MOISTURE 1.2 PPM 26

REMARKS 27

PARTICLE SIZE:

LARGER THAN 100 MICRONS [LIMIT: Ø PER 30 SCF]

30 TO 100 MICRONS [LIMIT: 25 MAXIMUM PER 30 SCF]

MOISTURE CONTENT [LIMIT: 24 PPM MAXIMUM]

HYDROCARBON CONTENT [LIMIT: 5 PPM MAXIMUM]

TEST PROCEDURE # TP-5C101-AT
ATTACHMENT # 4
PAGE 1 of 1

Acceptable

TECHNOLOGY LAB	28	DATE 29	CUSTOMER STAMP 30	DATE 31
	8296	05/14/97		

LIMS # 70001489

BLDG 420, CELL 2
7-3508 LWT-82

BLDG. 420

CONTAMINATION MEASUREMENT REPORT

DATE 1: 05-14-97	PART NO. 2: F78-1225-1-116		LIST NO.: 06781
NO. 3: N/A	DR NO. 4: N/A	5: ☐ ET ☑ GSE ☐ STE ☐ OTHER	CRITICAL SURFACE AREA (Sq. Ft.) 6: N/A
NOMENCLATURE 7: HELIUM TEST FLEXHOSE			DOCUMENT/MPP LIST NO. 8: TP-SC101-AT
SERIAL NO. 9: UNIT 1	P.O. NO. 10: N/A	AREA 11: ☐ FINAL CLEAN ☐ PRE-CLEAN ☐ PNEUMATIC ☑ OTHE	

SAMPLE 12				CHECK FOR 13			
	TRICH		H_2O	✓	PARTICULATE	✓	HYDROCARBON
	GN_2		AIR		.N.V.R.		pH
	FREON	✓	HELIUM		CONCENTRATION	✓	~~DEWPOINT~~ MOISTURE
	ENVIRONMENT				CONDUCTIVITY		

USED ON 14: ☐ PNEUMATICS ☐ HYDROGEN ☐ OXYGEN ☑ OTHER

CLEANING SPEC. 15: N/A

REVISION 16: N/A

INSPECTION STAMP & DATE 17	SAMPLE NO. 1 18	SAMPLE NO. 2 18	SAMPLE NO. 3 18	CUSTOMER STAMP & DATE 19	SAMPLE NO. 1 20	SAMPLE NO. 2 20	SAMPLE NO. 3 20
MSS 5/14/97 1989	ACCEPTED						

ANALYSIS RESULTS

PARTICULATE COUNT PER ~~Sq. Ft.~~ 30 SCF 21 SAMPLE NO. 1 1 (30-100μ); 0 >100μ	N.V.R. (GM/FT2) 22	HYDROCARBON CONTENT (P.P.M.) 23 2.1 PPM
PARTICULATE COUNT PER Sq. Ft. SAMPLE NO. 2	N.V.R. (GM/FT2)	HYDROCARBON CONTENT (P.P.M.)
PARTICULATE COUNT PER Sq. Ft. SAMPLE NO. 3	N.V.R. (GM/FT2)	HYDROCARBON CONTENT (P.P.M.)
CONCENTRATION (Oz/Gal.) 24	CONDUCTIVITY (OHMS) 25	~~pH~~ MOISTURE 26 LESS THAN 1 PPM

REMARKS 27

PARTICLE SIZE:

LARGER THAN 100 MICRONS [LIMIT: Ø PER 30 SCF]

30 TO 100 MICRONS [LIMIT: 25 MAXIMUM PER 30 SCF]

MOISTURE CONTENT [LIMIT: 24 PPM MAXIMUM]

HYDROCARBON CONTENT [LIMIT: 5 PPM MAXIMUM]

TEST PROCEDURE # TP-SC101-AT

ATTACHMENT # 5

PAGE 1 of 1

Acceptable

TECHNOLOGY LAB 28	DATE 29	CUSTOMER STAMP 30	DATE 31
39296	05/14/97		

7000 1491

CONTAMINATION MEASUREMENT REPORT

BIDG. 420

DATE 1: 05-14-97	PART NO. 2: F78-1399-1-105		LIST NO.: 06783
S NO. 3: N/A	DR NO. 4: N/A	5: ☐ ET ☒ GSE ☐ STE ☐ OTHER	CRITICAL SURFACE AREA (Sq. Ft.): N/A
N... ENCLATURE 7: ULLAGE TRANSDUCER KIT TEST FLEXHOSE			DOCUMENT/MPP LIST NO.: TP-5C101-AT
SERIAL NO.: UNIT 3 (MSS 273)	P.O. NO. 10: N/A	AREA 1: ☐ FINAL CLEAN ☐ PRE-CLEAN ☐ PNEUMATIC ☑ OTHE	

SAMPLE 12				CHECK FOR			
	TRICH		H_2O	✓	PARTICULATE	✓	HYDROCARBON
✓	GN_2		AIR		.N.V.R.		pH
	FREON				CONCENTRATION	✓	~~DEWPOINT~~ MOISTURE
	ENVIRONMENT				CONDUCTIVITY		

USED ON 14	CLEANING SPEC. 15	REVISION 16
☐ PNEUMATICS ☒ HYDROGEN ☒ OXYGEN ☐ OTHER	N/A	N/A

INSPECTION STAMP & DATE 17	SAMPLE NO. 1 18	SAMPLE NO. 2 18	SAMPLE NO. 3 18	CUSTOMER STAMP & DATE 19	SAMPLE NO. 1 20	SAMPLE NO. 2 20	SAMPLE NO. 3 2
MSS 273 5/15/97	Accepted						

ANALYSIS RESULTS

PARTICULATE COUNT PER ~~Sq. Ft.~~ 30 SCF 21 SAMPLE NO. 1 0 > 100; 1 (30-100μ)	N.V.R. (GM/FT2) 22	HYDROCARBON CONTENT (P.P.M.) 2 Less than 1 ppm
PARTICULATE COUNT PER Sq. Ft. SAMPLE NO. 2	N.V.R. (GM/FT2)	HYDROCARBON CONTENT (P.P.M.)
PARTICULATE COUNT PER Sq. Ft. SAMPLE NO. 3	N.V.R. (GM/FT2)	HYDROCARBON CONTENT (P.P.M.)
CONCENTRATION (Oz/Gal.) 24	CONDUCTIVITY (OHMS) 25	~~H~~ MOISTURE 1.5 ppm 2

ARKS 27

PARTICLE SIZE:

LARGER THAN 100 MICRONS [LIMIT: Ø PER 30 SCF]

30 TO 100 MICRONS [LIMIT: 25 MAXIMUM PER 30 SCF]

MOISTURE CONTENT [LIMIT: 24 PPM MAXIMUM]

HYDROCARBON CONTENT [LIMIT: 5 PPM MAXIMUM]

TEST PROCEDURE # TP-5C101-AT

ATTACHMENT # 6

PAGE 1 of 1

Acceptable

TECHNOLOGY LAB 28	DATE 29	CUSTOMER STAMP 30	DATE 31
R. May (40054 LAB)	5/15/97		

MAE/MIA 87-027 (1/90)

DD-250 MRB LISTING

DBQER100

DD250/MRB LISTING
FOR EXTERNAL TANK NO. 00082
BUILDING 420 COMPLETE

DATE: 06/25/97

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
PD4700189-029	00000000219	VALVE, VENT & RELIEF, GH2		N023283
PD4800175-099	00000000692	LINE ASSY	A	N014681
PD4800178-020	00000000126	LINE ASSY	A	N000030
PD4800180-080	00000001341	LINE ASSY	A	N000632
P2-305	9-131527	CHECK VALVE		N008331
P2-305	9-131527	CHECK VALVE		N008331
V527-415267-056	AA0501060	LH2 DISCONNECT UMBIL	A	N014047
10175-0001-102	1000181	BOLT CATCHER ASS GFP	B	T101544
10175-0001-102	1000225	BOLT CATCHER ASS GFP	B	T101544
10950-51-3-3	0391121	STRUT ASSY.		T121870
14180-3	PF-A-0065	FLANGE		N004390
14180-3	PF-A-0099	FLANGE		N004390
14180-3	PF-A-0103	FLANGE		N004390
14180-3	PF-A-0106	FLANGE		N004390
14180-3	PF-A-0124	FLANGE		N004390
14180-3	PF-A-0125	FLANGE		N004390
14180-33	PF-A-0315	FLANGE		N004391
14205-13	BJ757-04	TUBE BEND		N008805
14205-61	PF-A-0368	FLANGE		N004389
14205-61	PF-A-0373	FLANGE		N004389
14205-63	PF-A-0396	FLANGE		N004387
14205-63	PF-A-0406	FLANGE		N004387
14205-63	PF-A-0425	FLANGE		N004387
14205-63	PF-A-0432	FLANGE		N004387

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80901010000-109	00000000082	420 BLDG ET COMPLET		N023165
80901010000-109	00000000082	420 BLDG ET COMPLET		N023166
80901010000-109	00000000082	420 BLDG ET COMPLET		N023180
80901010000-109	00000000082	420 BLDG ET COMPLET		N024001
80901010000-109	00000000082	420 BLDG ET COMPLET		N024002
80901010000-109	00000000082	420 BLDG ET COMPLET		N023181
80901010000-109	00000000082	420 BLDG ET COMPLET		N023185
80901010000-109	00000000082	420 BLDG ET COMPLET		N019050
80901010000-109	00000000082	420 BLDG ET COMPLET		N016830
80901010000-109	00000000082	420 BLDG ET COMPLET		N019252
80901010000-109	00000000082	420 BLDG ET COMPLET		N019108
80901010000-109	00000000082	420 BLDG ET COMPLET		N023158
80901010000-109	00000000082	420 BLDG ET COMPLET		N023163
80901010000-109	00000000082	420 BLDG ET COMPLET		N023161
80901010000-109	00000000082	420 BLDG ET COMPLET		N019105
80901010000-109	00000000082	420 BLDG ET COMPLET		N023169
80901010000-109	00000000082	420 BLDG ET COMPLET		N023172
80901010000-109	00000000082	420 BLDG ET COMPLET		N023173
80901010000-109	00000000082	420 BLDG ET COMPLET		N023175
80901010000-109	00000000082	420 BLDG ET COMPLET		N023178
80901010000-109	00000000082	420 BLDG ET COMPLET		N019047
80911001207-029	00000398810	COVER PLATE FWD OGIV	B	N015798
80911001317-009	00000000042	FAIRING ASSY	B	N013532
80911031849-030	00000521080	CABLE TRAY & FAIRING	B	N019103

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80911071745-019	00000000384	STRUT VERTICAL	B	N001602
80911071763-001	BAJ0068	BALL FITTING		N007903
80911071764-001	BAJ0097	BALL FITTING		N007916
80911071809-060	00000466640	CABLE TRAY INSTL	B	N005958
80911071809-180	00000518650	CABLE TRAY/FAIR INST	B	N005957
80911071880-330	00000357790	CABLE TRAY ASSY LO2	B	N005958
80911071880-340	00000357790	C/BEAM MECH ASSY	B	N019412
80911071880-340	00000357790	C/BEAM MECH ASSY	B	N019418
80911071880-340	00000357790	C/BEAM MECH ASSY	B	N019601
80911071881-040	00000000622	SUPPORT	B	N004784
80911071881-040	00000000625	SUPPORT	B	N004784
80911071881-040	00000000627	SUPPORT	B	N004784
80911071881-049	00000000429	SUPPORT	B	N004784
80911100000-059	00000397250	LOX TANK I/T SPLICE		N016931
80911141201-010	00000000344	SUPPORT ASSY	A	N013530
80911141201-010	00000000348	SUPPORT ASSY	A	N013530
80911141201-010	00000000349	SUPPORT ASSY	A	N013530
80911141204-010	00000378230	P/L & C/T FTG INSTL		N024001
80912000100-020	00000320620	WELD ASSY		N015962
80912000100-020	00000320620	WELD ASSY		N015733
80912000100-020	00000320620	WELD ASSY		N015733
80912000100-020	00000320620	WELD ASSY		N015729
80912001100-019	00000339240	MECH & LUG WELD @ 7023		N017354
80912090000-029	00000306450	WELD ASSY	B	N015979

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80913000480-010	00000000062	PANEL ASSY	B	N013271
80913000509-060	00000283270	PANEL BUTTSTRAP INST	B	N013259
80913000519-019	00000282460	PANEL #1 TACK	B	N012935
80913000520-080	00000252060	FRAME ASSY	B	N010475
80913000521-001	00000000223	CHORD OUTER	B	N001461
80913000521-001	00000000225	CHORD OUTER	B	N001461
80913000534-002	00000001910	CHORD FRAME	B	N013296
80913000534-006	00000002962	CHORD FRAME	B	N012928
80913000539-020	00000282480	PANEL INSTL	B	N012938
80913000540-070	00000245410	FRAME SEGMENT	B	N010474
80913000545-090	00000251390	FRAME SEGMENT	B	N010477
80913000550-100	00000216710	FRAME SEGMENT ASSY	B	N012928
80913000569-020	00000283280	PANEL	B	N013264
80913000569-020	00000283280	PANEL	B	N013257
80913000579-019	00000283290	PANEL	B	N013263
80913000589-019	00000283300	PANEL INSTL #8	B	N014612
80913000609-019	00000281920	ROLL TIE INSTL	B	N014608
80913000610-040	00000275610	FRAME	B	N013296
80913000637-001	BAQ0006	SRB FITTING		N008138
80913000637-002	BAQ0020	SRB FITTING		N008138
80913000645-010	00000283310	ALIGN OF PANELS	B	N013271
80913001005-010	00000326130	INTERTANK COMPLETE		N015900
80913001005-010	00000326130	INTERTANK COMPLETE		N015898
80913001049-020	00000327780	PANEL BUTTSTRAP	B	N015897

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80914004000-020	00000391750	POST PROOF X-RAY	B	N020886
80914004000-020	00000391750	POST PROOF X-RAY	B	N020900
80914004000-020	00000391750	POST PROOF X-RAY	B	N020886
80914004000-020	00000391750	POST PROOF X-RAY	B	N020900
80914004000-020	00000391750	POST PROOF X-RAY	B	N020886
80914004000-020	00000391750	POST PROOF X-RAY	B	N020900
80914004000-020	00000391750	POST PROOF X-RAY	B	N016497
80914004000-020	00000391750	POST PROOF X-RAY	B	N020900
80914004000-020	00000391750	POST PROOF X-RAY	B	N016497
80914004000-020	00000391750	POST PROOF X-RAY	B	N016376
80914041414-002	AVA2668	TRAY SUPPORT		N000666
80914041416-009	00000000115	FITTING ASSY	A	N007631
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N019724
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N017554
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N019703
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N017573
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N017577
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N017569
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N017576
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N017573
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N017569
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N015665
80914090960-020	00000305740	LH TANK DYE PEN 5069	B	N015706
80914091985-001	00000001279	FITTING MACHINED	B	N000762

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80914100900-020	00000211610	WELD,ASSY,FWD DOME	B	N012615
80914100900-020	00000211610	WELD,ASSY,FWD DOME	B	N011309
80914120900-029	00000201720	DOME BODY	B	N011309
80914130930-019	00000184000	WELD FWD CAP (HFE/HFV)		N004241
80914130930-019	00000184000	WELD FWD CAP (HFE/HFV)		N004226
80914130930-019	00000184000	WELD FWD CAP (HFE/HFV)		N004241
80914140997-001	00000000252	CHORD OUTER	A	N007260
80914140997-001	00000000252	CHORD OUTER	A	N007658
80914150993-002	00000000084	DOME CAP LH2 FWD	A	N007832
80914151910-009	00000259090	FWD DOME @ 7054	B	N012640
80914151996-003	00000000532	WEB	A	N013903
80914200983-001	00000000137	PANEL BARREL LH2	B	N006955
80914200983-002	00000000198	PANEL BARREL LH2	B	N006955
80914200996-001	00000000137	PANEL BARREL LH2	B	N006957
80914200996-002	00000000197	PANEL BARREL LH2	B	N006957
80914200997-001	00000000084	PANEL BARREL LH2	B	N007767
80914200998-001	00000000083	PANEL BARREL LH2	B	N007751
80914200998-001	00000000083	PANEL BARREL LH2	B	N007756
80914400980-029	00000300160	BARREL #3 ASSY		N015758
80914400980-029	00000300160	BARREL #3 ASSY		N015691
80914400980-029	00000300160	BARREL #3 ASSY		N015761
80914400981-001	00000000136	PANEL BARREL LH2	B	N006951
80914400981-002	00000000196	PANEL BARREL LH2	B	N006951
80914400982-001	00000000273	PANEL BARREL LH2	B	N006954

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80914600975-002	00000000087	PANEL	A	N007769
80914601970-040	00000294480	BARREL #2		N012915
80914700993-002	00000000303	CHORD OUTER	A	N007656
80914701987-007	00000008086	STIFFENER,TEE	B	N007206
80914701987-007	00000008088	STIFFENER,TEE	B	N007206
80914701987-007	00000008091	STIFFENER,TEE	B	N007206
80914701987-007	00000008092	STIFFENER,TEE	B	N007206
80914701987-007	00000008093	STIFFENER,TEE	B	N007206
80914701987-007	00000008094	STIFFENER,TEE	B	N007206
80914701987-007	00000008095	STIFFENER,TEE	B	N007206
80914701987-007	00000008096	STIFFENER,TEE	B	N007206
80914701987-007	00000008097	STIFFENER,TEE	B	N007206
80914701987-007	00000008098	STIFFENER,TEE	B	N007206
80914701990-019	00000273990	1871 T-RING		N010464
80914701992-004	00000000499	CHORD INNER	A	N008778
80914800900-019	00000265630	BARREL NO.1 ASSY	B	N014365
80914800987-029	00000000247	LONGERON	A	N013940
80914800987-029	00000000247	LONGERON	A	N012912
80914800987-030	00000000284	LONGERON	A	N014365
80914800987-030	00000000284	LONGERON	A	T119755
80914800991-001	00000000142	PANEL BARREL LH2	B	N007759
80914800993-003	00000000146	PANEL LH2	B	N007763
80914800993-004	00000000204	PANEL LH2	B	N007764
80914800994-002	00000000090	PANEL LH2	B	N007765

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80921021026-040	00000457420	TUBE ASSY	B	N015403
80921021026-049	00000457430	TUBE ASSY	B	N015403
80921021026-059	00000457440	TUBE ASSY		N015403
80921021026-060	00000460300	TUBE ASSY		N023708
80921021027-030	00000460310	TUBE	B	N023705
80921021027-040	00000460320	TUBE ASSY	B	N023705
80921021027-049	00000460330	TUBE ASSY	B	N023705
80921021027-050	00000460340	TUBE ASSY	B	N023705
80921021035-009	00000456980	TUBE ASSY	B	N015404
80921021035-010	00000456930	TUBE ASSY	B	N015404
80921021035-019	00000456570	TUBE ASSY	B	N015404
80921021035-020	00000456580	TUBE ASSY	B	N015404
80921021039-180	00000457450	VENT VALVE COVER LO2		N015421
80921021043-010	00000459980	TUBE ASSY	B	N023697
80921021044-019	00000467240	DUCT GO2 VENT	B	N023266
80921021044-025	00000467240	HORN	B	N019042
80921021047-010	00000000097	PLATE LH2 DIFF MTG	A	N007352
80921021047-010	00000000097	PLATE LH2 DIFF MTG	A	N007663
80921021309-009	00000521020	PRESS &VENT SYSTEM	B	N023172
80921021309-009	00000521020	PRESS &VENT SYSTEM	B	N023283
80921021409-009	00000519070	DUCT VENT	B	N023266
80921061009-010	00000566350	V/DUCT F/HOSE INSTL	B	N019042
80923021032-009	00000304510	TUBE ASSY	B	N022137
80923021032-010	00000305400	TUBE ASSY	B	N022137

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80931003716-009	00000410660	TUBING ASSY	B	N015421
80931003716-079	00000410670	TUBE ASSY	B	N015421
80931003739-059	00000384490	FWD MAST	B	N018083
80931003810-029	00000521030	INTERTANK FINAL ASSY	B	N014497
80971008422-009	00000520220	TPS CLOSEOUT	B	N019589
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N023163
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N019840
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N019824
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N019814
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N019822
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N019820
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N020928
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N020933
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N019841
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N019575
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N023284
80971008428-019	00000521070	YOKE TPS CLOSEOUT	B	N023293
80971008433-020	00000521570	TPS CLOSEOUT LH2 PAL	B	N020932
80971008434-090	00000521580	TPS CLOSEOUT		N023178
80971008434-090	00000521580	TPS CLOSEOUT		N019815
80971008434-090	00000521580	TPS CLOSEOUT		N020927
80971008434-090	00000521580	TPS CLOSEOUT		N019839
80971008437-009	00000524170	TPS C/O ICE FROST	B	N023161
80971008437-009	00000524170	TPS C/O ICE FROST	B	N019812

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
80971008455-030	00000520320	SLA APPL UMB C/T	B	N020946
80971008456-039	00000520350	TPS CLOSEOUT		N023158
80971008456-039	00000520350	TPS CLOSEOUT		N023280
80971008456-039	00000520350	TPS CLOSEOUT		N019842
80971008456-039	00000520350	TPS CLOSEOUT		N019818
80971008459-059	00000521680	FITTING TPS CLOSEOUT LH2		N019844
80971008459-059	00000521680	FITTING TPS CLOSEOUT LH2		N019843
80971008459-059	00000521680	FITTING TPS CLOSEOUT LH2		N019826
80971008459-059	00000521680	FITTING TPS CLOSEOUT LH2		N019591
80971008459-059	00000521680	FITTING TPS CLOSEOUT LH2		N019823
80971009442-219	00000487580	SRB FAIRING, SOFI		N023275
80971009442-220	00000487590	SRB FAIRING, SOFI		N023276
80971009442-220	00000487590	SRB FAIRING, SOFI		N011359
80971018422-500	00000489870	LH2 AFT SRB FOAM CLOSEOUT		N022128
80971018424-020	00000500440	TPS CLOSEOUT		N028709
80971018424-020	00000500440	TPS CLOSEOUT		N020259
80971018424-020	00000500440	TPS CLOSEOUT		N028704
80971018424-020	00000500440	TPS CLOSEOUT		N022130
80971028422-109	00000491060	CABLE TRAY	B	N014245
80971028425-009	00000454020	LO2 F/L SOFI APPL	B	N019105
80971028425-010	00000452670	LO2 F/L SOFI APPL	B	N023163
80971028445-110	00000463420	CABLE TRAY, SOFI APPL	B	N017863
80971028449-089	00000453010	FAIRING ASSY	B	N014219
80971028449-119	00000475490	FAIRING SOFI APPL	B	N021418

PART NUMBER	LOT-OR-S/N	PART NAME	NCD NO.	Spill/Leak
80974008419-019	00000485980	LH2 BARREL FOAM CLOSEOUTS	N020121	
80974018410-040	00000483170	LH2 FWD DOME FOAM	N020119	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N023170	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N019843	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N020936	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N023293	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N019823	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N023284	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N019581	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N021435	S
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N020121	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N022139	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N022138	
80974018411-500	00000490890	BARREL LH2 FOAM APPL	N022137	
80974028460-069	00000411080	FITTING ASSY B	N014239	
80974048410-020	00000509020	LH AFT DOME FOAM CLOSEOUT	N019108	
80974048410-020	00000509020	LH AFT DOME FOAM CLOSEOUT	N023173	
80974048410-020	00000509020	LH AFT DOME FOAM CLOSEOUT	N020934	
80974048410-020	00000509020	LH AFT DOME FOAM CLOSEOUT	N024602	
80974048410-020	00000509020	LH AFT DOME FOAM CLOSEOUT	N022129	
80974048410-020	00000509020	LH AFT DOME FOAM CLOSEOUT	N021429	
80974048410-020	00000509020	LH AFT DOME FOAM CLOSEOUT	N021434	
80974048410-020	00000509020	LH AFT DOME FOAM CLOSEOUT	N021436	
82614301031-001	00000000522	FORGING ALUM B	T089036	

S = Spill/Leak

DBQER100

DD250/MRB LISTING
FOR EXTERNAL TANK NO. 00082
PACK AND SHIP DD250

DATE: 06/12/97

PART NUMBER	LOT-OR-S/N	PART NAME		NCD NO.
10175-0001-102	1000181	BOLT CATCHER ASS GFP	B	T101544
10175-0001-102	1000225	BOLT CATCHER ASS GFP	B	T101544
80971009442-219	00000487580	SRB FAIRING, SOFI		N023275
80971009442-220	00000487590	SRB FAIRING, SOFI		N023276
80971009442-220	00000487590	SRB FAIRING, SOFI		N011359
80973028412-070	00000303020	SRB BRKT FRNG SLA APPL	B	N010050

ET/ORBITER ALIGNMENT DATA

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: 80901006000-OP22

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
3/12/97			
------ SHOP	FAEM	0700	VERIFY PLANE OF LH2 AND LO2 UMBILICALS BY PLACING A DEPTH MICROMETER WITH APPROPRIATE EXTENSION (4-5 INCH) THRU TOOLING HOLES (3) PLACES IN T12A7393-6-101 MODULE AND (3) PLACES IN T12A7393-5-101 MODULE (REF ATTACHMENT #4). AT EACH HOLE, ADJUST MICROMETER UNTIL SPINDLE CONTACTS UMBILICAL AND RECORD TOTAL DEPTH READING (EXAMPLE: 4.089) ON ATTACHMENT #4. RECORD: MICROMETER I.D. TL-0830-8-37 CAL DUE DATE 6/10/97 VERIFY THAT THE (3) LH2 UMBILICAL READINGS ARE WITHIN 0.050 INCH AND THE (3) LO2 UMBILICAL READINGS ARE WITHIN 0.050 INCH. NOTE: READINGS NEED ONLY BE WITHIN 0.050 INCH ON EACH SIDE; NOT NECESSARILY FROM SIDE TO SIDE.
3/12/97			
------ QCBC	QEFA	0701	VERIFY RECORDED READINGS ARE WITHIN .050 INCH. VERIFY CORRECT DATA RECORDED.
R32785 3-12-97			DWG 80900000050 SHT 5, PLAN VIEW; FLAG NOTE 16
------ SHOP	FAEM	0702	VERIFY 20.2 PERFECT THREAD (1.66 +/-.03 IN.) EXPOSURE ON 80911009188 CLEVIS FITTING. IF REQUIRED, UNPIN AND ADJUST BIPOD STRUT TO ATTAIN 20.2 PERFECT THREAD (1.66 +/-.03 IN.) EXPOSURE ON FITTING. RE-PIN BIPOD STRUT. RECORD NUMBER (OR LENGTH) OF EXPOSED PERFECT THREADS ON 80911009188 CLEVIS FITTING: 20.2
MSS 102 3-12-97			
------ QCBC	QEFA	0703	INSPECT TO ENSURE 20.2 PERFECT THREADS (1.66 +/-.03 IN.) ARE EXPOSED ON 80911009188 CLEVIS FITTING.
81434			
3-12-97 SHOP	TJFA	0705	USING SCOPE ON T12A7393 TRUSS ASSY, OPTICALLY SHOOT SCALE ON T38S0307-1-105 HOLDER TO DETERMINE LOCATION OF EO-1 IN RELATION TO CENTERLINE OF EO-2 AND EO-3 WITH 20.2 PERFECT THREADS (1.66 +/-.03 IN.) EXPOSED ON 80911009188 CLEVIS FITTING. RECORD SCALE READING: 2.986 RECORD: SCOPE I.D. NS-128893 CAL DUE DATE 3-14-97

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: 80901006000-OP22

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
3-12-97 QCBC	QTLG	0706	VERIFY SCALE DIMENSION RECORDED ABOVE. VERIFY SCOPE I.D. NUMBER AND CALIBRATION DUE DATE IS RECORDED. NOTE: IF EO-1 IS WITHIN +/-.200 OF CENTERLINE OF EO-2 AND EO-3 PER DWG 80900000050 FLAG NOTE 16 (3.000 +/-.200 ON THE OPTIC SCALE), "N/A" STEPS 0710-0713. WORK STEP 0712 IN CONJUNCTION WITH FOLLOWING STEP.
R82755 3-12-97 N/A ------ SHOP	FAEM	0710	IF REQUIRED, UNPIN AND ADJUST BIPOD STRUT TO ATTAIN 3.000 +/-.200 BIPOD SCALE READING. RE-PIN BIPOD STRUT. RECORD NUMBER (OR LENGTH) OF EXPOSED PERFECT THREADS ON 80911009188 CLEVIS FITTING: _____
MSS 182 3-12-97 N/A ------ QCBC	QTLG	0711	INSPECT TO ENSURE NUMBER (OR LENGTH) OF EXPOSED PERFECT THREADS AS RECORDED ABOVE.
81434 N/A 3-12-97 ------ SHOP	TJFA	0712	USING SCOPE ON T12A7393 TRUSS ASSY, OPTICALLY SHOOT SCALE ON T38S0307-1-105 HOLDER TO DETERMINE LOCATION OF EO-1 IN RELATION TO CENTERLINE OF EO-2 AND EO-3 AFTER BIPOD STRUT ADJUSTMENT. RECORD SCALE READING: _____ RECORD: SCOPE I.D. _____ CAL DUE DATE _____
MSS 182 N/A 3-12-97 ------ QCBC 3-12-97	QTLG	0713	VERIFY SCALE DIMENSION RECORDED ABOVE. VERIFY SCOPE I.D. NUMBER AND CALIBRATION DUE DATE IS RECORDED. NOTE: WORK STEP 0717 IN CONJUNCTION WITH FOLLOWING STEP
R82755 3-12-97 R82755 ------ SHOP	FAEM	0715	DWG 80900000050 SHT 5, PLAN VIEW; FLAG NOTE 17 UNPIN AND ADJUST BIPOD STRUT TO VERIFY (+Y) AND (-Y) TRAVE OF 1.07 MINIMUM EACH DIRECTION FROM CENTERLINE OF EO-1 WITHOUT EXCEEDING 39 THREAD MAXIMUM AND 1 THREAD MINIMUM LIMITS ON 80911009188 CLEVIS FITTING PER FLAG NOTE 17 USIN T38S0307-1-43/1-44 GAGES. (T38S0307 FIG 1 RETURN BIPOD ASSY TO INITIAL EXPOSED PERFECT THREADS/SCALE READING RECORDED IN STEP 0702 OR STEP 0710 IF BIBOD ADJUSTMENT WAS REQUIRED.

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: 80901006000-OP22

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
MSS 102 3-12-97 ------ QCBC	QEFA	0716	VERIFY DIMENSIONS ARE ACCEPTABLE PER DWG REQUIREMENTS.
81434 3-12-97 SHOP	TJFA	0717	USING SCOPE ON T12A7393 TRUSS ASSY, OPTICALLY SHOOT SCALE ON T38S0307-1-105 HOLDER AT 1.07 MINIMUM TRAVEL IN EACH DIRECTION. RECORD SCALE READING AT 1.07 MINIMUM TRAVEL IN EACH DIRECTION: (+Y) SCALE READING 4.280 (-Y) SCALE READING 1.672 RECORD: SCOPE I.D. NS-128893 CAL DUE DATE 3-14-97
MSS 182 3-12-97 QCBC	QTLG	0718	VERIFY SCALE READINGS AS RECORDED ABOVE. VERIFY SCOPE I.D. NUMBER AND CALIBRATION DUE DATE IS RECORDED.
81233 3-12-97 ------ SHOP	FAEM	0720	OBTAIN CERTIFIED PHOTOGRAPHIC DOCUMENTATION OF THE BIPOD FIT CHECK INSTALLATION PER FLAG NOTE 23. RECORD NEGATIVE NUMBER: 1693
MSS 102 3-12-97 ------ QCBC	QEFA	0721	VERIFY PHOTOGRAPHS HAVE BEEN TAKEN AND NEGATIVE NUMBER IS RECORDED .

3-12-

CERTIFICATE OF VERIFICATION
FOR THE
ISOPROPYL ALCOHOL

Certification of Isopropyl Alcohol Usage Control on the External Tank

June 27, 1997

This Certifies that to the best of my knowledge and belief based on examination of records by responsible parties, the usage of Isopropyl Alcohol (IPA) on:

External Tank 89 (S/N0000082)

was in accordance with the requirements of MMC-ET-RA12, Contamination Control Program as implemented by STP 5008 which requires the removal of IPA used during ET production.

CONCURRENCE:

R.F. Hieter
Vice President, Production Operations
Lockheed Martin Manned Space Systems

APPROVED:

T.L. Hibbard
Vice President, ET Project
Lockheed Martin Manned Space Systems

ET-89 / [illegible]VT-82

AGE SENSITIVE ITEM

SCID REQUIREMENT

PART NUMBER	PART NAME	SERIAL NUMBER	SCID REQM'T	ACC EPT TE ST DA TE	MFG DATE	INSTL/ DELIVERY DATE	RECERT DATE	EXP IRE DA TE	REF DESIGNTR/ REMARK
PD7400244-009	Temp Sensor	0000028	10 yrs	02-10- 1995	N/A	03-19-1997	N/A	02-10- 2005	302A13
PD7400244-019	Temp Sensor	0000090	10 yrs	02-13- 1995	N/A	03-06-1997	N/A	02-13- 2005	326A13
PD7400244-029	Temp.Sensor	0000230	10 yrs	12-14- 1994	N/A	11-16-1995	N/A	12-14- 2004	314A31
PD7400244-029	Temp.Sensor	0000231	10 yrs	12-14- 1994	N/A	11-16-1995	N/A	12-14- 2004	314A32
PD7400244-029	Temp.Sensor	0000256	10 yrs	01-18- 1995	N/A	03-26-1997	N/A	01-18- 2005	327A9
PD7400244-029	Temp.Sensor	0000257	10 yrs	01-18- 1995	N/A	03-26-1997	N/A	01-18- 2005	327A10
PD7400239-009	Press Trans	0000167	10 yrs	01-26- 1996	N/A	03-26-1997	N/A	01-26- 2006	327A2
80931003731-009	Filter Tran	0000093	10 yrs	01-26- 1996	N/A	03-26-1997	N/A	01-26- 2006	
PD7400239-009	Press Trans	0000168	10 yrs	01-26- 1996	N/A	03-26-1997	N/A	01-26- 2006	327A3
80931003731-009	Filter Trans	0000094	10 yrs	01-26- 1996	N/A	03-26-1997	N/A	01-26- 2006	
PD7400239-009	Press Trans	0000169	10 yrs	01-26- 1996	N/A	03-26-1997	N/A	01-26- 2006	327A4
80931003731-009	Filter Tran	0000095	10 yrs	01-26- 1996	N/A	03-26-1997	N/A	01-26- 2006	

ET-89 / /T-82
AGE SENSITIVE ITEM
SCID REQUIREMENT

PART NUMBER	PART NAME	SERIAL NUMBER	SCID REQM'T	ACC EPT TE ST DA TE	MFG DATE	INSTL/ DELIVERY DATE	RECERT DATE	EXP IRE DA TE	REF DESIGNTR/ REMARK
PD7400098-089	Press Trans	0001726	10 yrs	12-14- 1994	N/A	02-19-1997	N/A	12-14- 2004	303A2
PD7400098-089	Press Trans	0001727	10 yrs	12-14- 1994	N/A	02-19-1997	N/A	12-14- 2004	303A3
PD7400098-089	Press Trans	0001728	10 yrs	12-14- 1994	N/A	02-19-1997	N/A	12-14- 2004	303A4
PD7400098-089	Press Trans	0001729	10 yrs	12-14- 1994	N/A	02-19-1997	N/A	12-14- 2004	303A5
PD7400106-079	Press Trans	0001242	10 yrs	05-29- 1996	N/A	03-10-1997	N/A	05-29- 2006	327A7
PD7400106-079	Press Trans	0001260	10 yrs	12-18- 1995	N/A	03-10-1997	N/A	12-18- 2005	327A8
74L4-1	LO2 Level Sensor	0001665	10 yrs	09-19- 1994	N/A	03-06-1997	N/A	09-19- 2004	326A12
74L4-1	LO2 Level Sensor	0001641	10 yrs	12-03- 1993	N/A	01-22-1996	N/A	12-03- 2003	326A5
74L4-1	LO2 Level Sensor	0001659	10 yrs	09-16- 1994	N/A	03-06-1997	N/A	09-16- 2004	326A6
74L4-1	LO2 Level Sensor	0001662	10 yrs	05-11- 1994	N/A	03-06-1997	N/A	05-11- 2004	326A8
74L4-1	LO2 Level Sensor	0001663	10 yrs	05-11- 1994	N/A	03-06-1997	N/A	05-11- 2004	326A9
74L4-1	LO2 Level Sensor	0001664	10 yrs	09-19- 1994	N/A	03-06-1997	N/A	09-19- 2004	326A10
74L4-1	LO2 Level Sensor	0001666	10 yrs	09-19- 1994	N/A	03-06-1997	N/A	09-19- 2004	326A11
74L4-1	LO2 Level Sensor	0001661	10 yrs	05-11- 1994	N/A	03-06-1997	N/A	05-11- 2004	326A7

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AGE SENSITIVE ITEM
SCID REQUIREMENT

PART NUMBER	PART NAME	SERIAL NUMBER	SCID REQM'T	ACC EPT TE ST DA TE	MFG DATE	INSTL/ DELIVERY DATE	RECERT DATE	EXP IRE DA TE	REF DESIGNTR/ REMARK
74L4-2	LH2 Level Sensor	0002241	10 yrs	05-11- 1994	N/A	10-23-1996	N/A	05-11- 2004	302A14
74L4-2	LH2 Level Sensor	0002243	10 yrs	05-11- 1994	N/A	10-23-1996	N/A	05-11- 2004	302A15
74L4-2	LH2 Level Sensor	0002244	10 yrs	05-11- 1994	N/A	10-23-1996	N/A	05-11- 2004	302A16
74L4-2	LH2 Level Sensor	0002245	10 yrs	05-11- 1994	N/A	10-23-1996	N/A	05-11- 2004	302A17
74L4-2	LH2 Level Sensor	0002240	10 yrs	05-11- 1994	N/A	10-23-1996	N/A	05-11- 2004	302A5
74L4-2	LH2 Level Sensor	0002249	10 yrs	05-11- 1994	N/A	03-19-1997	N/A	05-11- 2004	302A10
74L4-2	LH2 Level Sensor	0002247	10 yrs	05-11- 1994	N/A	03-19-1997	N/A	05-11- 2004	302A8
74L4-2	LH2 Level Sensor	0002250	10 yrs	09-19- 1994	N/A	03-19-1997	N/A	09-19- 2004	302A11
74L4-2	LH2 Level Sensor	0002248	10 yrs	05-11- 1994	N/A	03-19-1997	N/A	05-11- 2004	302A9
74L4-2	LH2 Level Sensor	0002242	10 yrs	09-19- 1994	N/A	03-19-1997	N/A	09-19- 2004	302A6
74L4-2	LH2 Level Sensor	0002246	10 yrs	05-11- 1994	N/A	03-19-1997	N/A	05-11- 2004	302A7
74L4-2	LH2 Level Sensor	0002251	10 yrs	09-19- 1994	N/A	03-19-1997	N/A	09-19- 2004	302A12
PD4700187-079	GO2 Vent/Relief	0000496	12 Yrs	08-19- 1996	N/A	03-10-1997	N/A	08-19- 2008	327A1
PD4700189-029	GH2 Vent/Relief	0000219	12 Yrs	11-13- 1996	N/A	04-11-1997	N/A	11-13- 2008	303A1

ET-89 / [illegible]T-82
AGE SENSITIVE ITEM
SCID REQUIREMENT

PART NUMBER	PART NAME	SERIAL NUMBER	SCID REQM'T	ACC EPT TE ST DA TE	MFG DATE	INSTL/ DELIVERY DATE	RECERT DATE	EXP IRE DA TE	REF DESIGNTR/ REMARK
80901010000-109* 80901000000-270**	ET Complete	0000082	6 Yrs	N/A	N/A	06-27-1997	N/A	06-27- 2003	N/A
80911041201-139	Nose Cone Spike	566700	8 Yrs	N/A		06-27-1997	N/A	06-27- 2005	N/A
80971048420-179	Nose Cone Fairing	489400	8 Yrs	N/A	N/A	06-27-1997	N/A	06-27- 2005	N/A

*MAF - As Delivered
**KSC - As Planned

WAIVERS/DEVIATIONS

MINOR WAIVERS

1. N003457
2. NO15812

3.2

NCD NONCONFORMANCE DOCUMENT

MRB 41a J NMS

N003457

DOCUMENT INITIATION DATA

ASSY/DETAIL PART NUMBER: 809140020000-009
a TRACEABILITY NUMBER: 0000000082
b ORDER TYPE/NUMBER: 0000038224 0
ASSY/DETAIL PART NAME: LH2 Tank Proof
d PROJECT: ET COMM
e EFFECTIVITY: LWT-082 40 02
f CTRL PT
g GFP: Y / G / N
SUPPLIER CODE i
SUPPLIER NAME j
ORIGINATION LOCATION k: BWTS-452
TAIR BOOK (BK/PG)
INITIAL REPORT m
REFERENCE DOCUMENT(S): 809140020-08 and TP-14D101-PT

ITEM INITIATION DATA

ITEM 1: 1
PART NUMBER 2: 809140020000-009
TRACEABILITY NUMBER 3: 0000000082
LOT QTY 4: 1
QTY REJ 5: 1
UOM
PART NAME 7: LH2 Tank Proof
PI NUMBER 8
STEP NO 9: 0030
SHEET / ZONE / VIEW 10
CA TYPE: I / D / A
DEFECT CODE 12: TFDDDTATP
HDWR CODE 13
CC 14: TE
EE BADGE 15
FAILURE 16: Y / N
CRIT 17
DEPT FND 18: 3681
DEPT LBL 19: 3611
SCC 20
WELD CODE 21
WELD GRD
INITIATED BY: Fred Kovach
BADGE: 82120
DATE 29: 3-20-96
WELD TYPE 23: TIG / VPPA
ORIG WELD TOOL 24
DETECT METHOD: VISUAL / X-RAY / PENETRANT
VALIDATED BY: [illegible]
BADGE: 66386
DATE 30: 3-20-96
MATERIAL THICKNESS 26: ACTUAL / DRAWING
DEFECT LOC 27: ISL / OSL
REP ATTEMPT 28: ISL / OSL
RELIABILITY ASSURANCE
BADGE
DATE 31
DISCREPANCY DESCRIPTION 32: During 100 Percent Proof Pressure and 100 Percent Hydraulic Loading, The actual Test Time was 37 minutes and 50 Seconds. Drawing Requirement: Should Not Be Greater Than 30 minutes.
REPAIR 33
DEFECT LOCATION 34
DEFECT LENGTH

Item 1 Blocks 6a-3 to 38224 0
Item 2 & 8, Blks. 3 to 38224 0
5/14/97

CAUSE AND CORRECTIVE ACTION DATA

CAUSE: THE SYSTEM WAS NOT TESTED TO RUN AT 1% PER SECOND WHEN APPLYING LOADS. SYSTEM IS BEING MODIFIED TO ALLOW COMPLIANCE TO REQ.

CORRECTIVE ACTION: SYSTEM IS BEING MODIFIED BY ADDING BLOCK VALVES TO THE TENSION & COMPRESSION SIDES WHICH WILL ALLOW COMPLIANCE TO REQ.

CAC 38: C. Ramirez
CAUSE & CORRECTIVE ACTION ACCEPTANCE
BADGE: 58341
DATE 39: 7/8/96
PA&A CAUSE & CORRECTIVE ACTION REVIEW
BADGE: 57182
DATE: 7-12-96

DISPOSITION DATA

J MRB 41
DISPOSITION 42: Submit to Eng. for evaluation.
[illegible] 3-20-96
SHOP STAMP 43
INSP STAMP 44: MSS 228 5/2/96
CUST STAMP
VISUAL INSPECTION 46: ACCEPT / REJECT
PROD OPS X-RAY: ACCEPT / REJECT
WELDER 48
PA X-RAY: ACCEPT / REJECT
WELD WIRE ACCEPTANCE 50
PENETRANT: ACCEPT / REJECT
REPAIR PER SRI W-001 52: I / II / III
WELD WIRE LAB TICKET
PCN 54
WELD WIRE LOT NUMBER
MR CD 56: 3
LAB / LICALL 57
SRI NUMBER 58
NUMBER OF ATTACHMENTS 59: 1 2 3 4 5 6 7 8 9 10 / 5
NUMBER OF NCSDs: 1 2 3 4 5 6 7 8 9 10 / 1

DOCUMENT CLOSURE DATA

DISP CODE o: N / M / F / C
NUMBER OF ITEMS p: 1 2 3 4 5 6 7 8 9 10
TRANSFER TO DOCUMENT q
PRODUCTION OPERATIONS CLOSURE ACCEPTANCE
BADGE: 57289
DATE: 5/2/96
QC SUPERVISOR CLOSURE ACCEPTANCE
BADGE
DATE
CUSTOMER CLOSURE ACCEPTANCE
DATE

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE 3
N,0,0,3,4,5,7	1	2

BLOCK 42 CONT'D

PRIOR TO REPROOF OF LWT-82 LH2 TANK, INSPECTION OF FORWARD DOME OIL CAN REGION MUST BE ACCOMPLISHED AS DESCRIBED IN NCD N013904. AFTER ACCEPTABLE INSPECTION, TANK MUST BE PROOF TESTED PER DRAWING 809 14002018 WITH ALL 5 PROOF LOAD CASES APPLIED DURING ONE PRESSURE CYCLE TO FULL PROOF PRESSURE RANGE. RESUBMIT AFTER PROOF TEST WITH ACTUAL TEST TIME AT FULL PRESSURE AND FOR RE-EVALUATION OF POST PROOF INSPECTION REQUIREMENT.

STRESS MRB: Glen Wadge 3-22-96
PA&A/MRB [illegible] 3-22-96
NASA S&E: [illegible] 3-22-96
NASA S&MA: James T. Hawkins 3-22-96

MAF/MMA 37-028 (12/93)

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE
N 0 0 3 4 5 7	1	3

BLOCK 42 CONT'D. THIS ITEM IS SUBMITTED TO ENG. FOR MINOR WAIVER PROCESSING FOR TM04K-B VIOLATION REF. PARA. 2.3.1.2 OF TM04K-B.

PA&A/MRB [signature] 4/12/96

BLOCK 42 CONT'D

THIS NCD TO BE HELD OPEN PENDING RESULTS OF SPECIAL INVESTIGATION SI-96-S008.

STRESS MRB: [signature] 4-12-96

Block 42 Cont.

Resubmit to Engineering, Attn: G. Wadge. SI-96-S008 addresses the cracking of ET-84 only. The failure of the Bldg 451 to meet time requirements must be addressed by other means.

[signature] Reliability Assurance 4/15/96

BLOCK 42 CONT'D

SEE ITEM 3 PAGE 4, LINES 3 – 17 FOR DISPOSITI

STRESS MRB: [signature] 5-15-96

BLOCK 42 CONT'D.

REFERENCE ENG. REQUEST ON NCSD 1-2 LINES 10-12, REFER TO ATTACHMENT 3-1 FOR ACTUAL TEST TIME AND PRESSURE. SUBMIT TO ENG. FOR EVALUATION.

[signature] 5-21-96

MAF/MMA 37-028 (12/93)

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE
N1001314517	1	4

BLOCK 42 CONT'D

ALL WORK DISPOSITION ON THIS NCD IS COMPLETED AND ACCEPTABLE. WITHHELD TAG HAS BEEN REMOVED AND DISTROYED.

P. A. B. [illegible] 5/22/96 MSS 228

MAF/MMA 37-028 (12/93)

Att T-7
Pg 2 of 3

EXTERNAL TANK ET-89
MINOR WAIVER NO. N003457

MINOR WAIVER DESCRIPTION

DOCUMENT NO.	TITLE	AFFECTED PARA.
MMC-ET-TM04k-B	Space Shuttle ET Flight Acceptance Requirement	2.3.1.2

SPECIFIED REQUIREMENTS

There shall be no rupture of the LH2 tank when pressurized and loaded per drawing 80914002018. Drawing 80914002018 requires all hydraulic load cases be completed within 30 minutes while at proof pressure.

DESCRIPTION OF DEPARTURE FROM REQUIREMENTS

Item One: Proof pressure under hydraulic load case was held 9 minutes & 50 seconds longer than specified 30 minute requirement.

Item Three: During a second test, proof pressure under hydraulic load case was held 46 minutes longer than specified 30 minute requirement.

Engineering disposition is Use As Is. Excess time does not affect the adequacy of the proof test or the structural integrity of the tank. Areas that are proof tested by pressure only, are not affected by the hold time. Areas that are proof tested by a combination of applied loads and pressure, see a higher loading with applied loads than with pressure only.

The 30 minute time limit in drawing 80914002018 is intended to reduce the risk of failure in proof.

AUTHORIZED MINOR WAIVER FOR ET-89 (LWT-82)
(Based on Engineering disposition form, fit, or function not affected)

ENGINEERING LIAISON Glen Wadge DATE 5-15-96

CONTRACTS [illegible] DATE 5-17-96

NASA SRM&QA / MAF James T. Hawkins DATE 5-15-96

NASA / MAF / RMO Harold Benesz DATE 5-17-96

DPRO / ACO Jacklyn A. Connelly DATE 5-17-96

MAF/MMA 33- 047 (11/90)

NUMBER N003457

CHANGE NO.	REQUIREMENT NUMBER	DESCRIPTION	MEAS/ STIMULI	SPECIFICATION		INTERVAL/CONSTRAINTS
	2.3	STRUCTURAL SUBSYSTEM			c.1	CAUTION LO2 AND LH2 TANKS MUST NOT BE SUBJECTED TO NEGATIVE DELTA PRESSURE. MAINTAIN 3.3+/- 1.7 PSIG IN THE TANKS EXCEPT AS REQUIRED BY SPECIFIED TESTS AND WHEN DESICCANTS ARE IN USE.
					c.2	WARNING HAZARDOUS TO PERSONNEL AND PROPERTY WHILE PRESSURIZED, WATER FILLED, OR UNDER LOAD.
	2.3.1	PROOF TEST VERIFICATION			C.1	PROCEDURES: TP-14D101-HY FOR PARA.2.3.1.1, TP-14D101-PT FOR PARA 2.3.1.2.
	2.3.1.1	LO2 TANK STRUCTURAL INTEGRITY		THERE SHALL BE NO RUPTURE WHEN PRESSURIZED PER DWG 80912002018		
	2.3.1.2	LH2 TANK STRUCTURAL INTEGRITY		THERE SHALL BE NO RUPTURE WHEN PRESSURIZED AND LOADED PER DWG 80914002018		
	2.3.1.3	NOT USED				
PRCN L-FB RCN 131	2.3.1.4	LO2 FEEDLINE STRAIGHT SECTION STRUCTURAL INTEGRITY		THERE SHALL BE NO RUPTURE WHEN PRESSURIZED AND LOADED PER DRAWING 82621011018	b.1	EF

Minor waiver form required?

ACCEPTANCE REQUIREMENTS AND SPECIFICATIONS

CHANGE NO.	REQUIREMENT NUMBER	DESCRIPTION	MEAS/ STIMULI	SPECIFICATION		INTERVAL/CONSTRAINTS
	1.3	STRUCTURAL SUBSYSTEM			c.1	CAUTION LO2 AND LH2 TANKS MUST NOT BE SUBJECTED TO NEGATIVE DELTA PRESSURE. MAINTAIN 3.3+/- 1.7 PSIG IN THE TANKS EXCEPT AS REQUIRED BY SPECIFIED TESTS AND WHEN DESICCANTS ARE IN USE.
					c.2	WARNING HAZARDOUS TO PERSONNEL AND PROPERTY WHILE PRESSURIZED, WATER FILLED, OR UNDER LOAD.
	2.3.1	PROOF TEST VERIFICATION			C.1	PROCEDURES: TP-14D101-HY FOR PARA.2.3.1.1, TP-14D101-PT FOR PARA 2.3.1.2.
	2.3.1.1	LO2 TANK STRUCTURAL INTEGRITY		THERE SHALL BE NO RUPTURE WHEN PRESSURIZED PER DWG 80912002018		
	2.3.1.2	LH2 TANK STRUCTURAL INTEGRITY		THERE SHALL BE NO RUPTURE WHEN PRESSURIZED AND LOADED PER DWG 80914002018		
	2.3.1.3	NOT USED				
PRCN L-FB RCN 131	2.3.1.4	LO2 FEEDLINE STRAIGHT SECTION STRUCTURAL INTEGRITY		THERE SHALL BE NO RUPTURE WHEN PRESSURIZED AND LOADED PER DRAWING 82621011018	b.1	EFFECTIVITY: LWT-68 AND SUBS

Summary Report for EF-069 tested on 03/28/96

10% test in Manual Mode

Test Case	Start Time	Achieved	End Time
A	16:16:10	16:17:34	16:18:33
B	16:19:06	16:20:04	16:21:03
C	16:21:21	16:22:16	16:23:06
D	16:23:21	16:24:10	16:24:59
E	16:25:32	16:26:56	16:28:26

100% test in Manual Mode

Test Case	Start Time	Achieved	End Time
A	17:44:08	17:51:06	17:58:24
B	16:44:36	16:51:26	16:58:42
C	17:14:44	17:21:44	17:29:35
D	17:29:56	17:36:52	17:43:45
E	16:59:14	17:06:35	17:14:20

Elapsed time above 60%: 01:27:01
Elapsed time at 100%: 01:15:55
Elapsed time from 80 to 100%: 00:04:21
Elapsed time from 100 to 80%: 00:00:59

NUMBER N0034573
ATTACHMENT NO. 1-3
PAGE 1 OF 1

NCID NONCONFORMANCE ITEM DATA

NCD NUMBER A1	ITEM A2	PAGE
N003457	2	1

ITEM INITIATION DATA

ITEM 1	PART NUMBER	TRACEABILITY NUMBER 3	LOT QTY 4	QTY REJ 5	UOM
2	3091400200000-009	00000000082	1	1	

PART NAME 7	PI NUMBER 8	STEP NO 9	SHEET / ZONE / VIEW 10	CA TYPE
LH2 Tank Proof		0030		I / D

DEFECT CODE 12	HDWR CODE 13	CC 14	EE BADGE 15	FAILURE 16	CRIT 17	DEPT FND 18	DEPT LBL 19	SCC 20	WELD CODE 21	WELD GRD
TFD00DTATP		TE		Y / N		3681	3611			

INITIATED BY	BADGE	DATE 29	WELD TYPE 23	ORIG WELD TOOL 24	DETECT METHOD
Arlen Kovitch	821803	3-20-96	TIG / VPPA		☐ VISUAL

VALIDATED BY	BADGE	DATE 30	MATERIAL THICKNESS 26 ACTUAL	DRAWING	DEFECT LOC 27	☐ X-RAY
	663840	3-20-96			ISL / OSL	

RELIABILITY ASSURANCE	BADGE	DATE 31	REP ATTEMPT 28	☐ PENETRAN
			ISL / OSL	

DISCREPANCY DESCRIPTION 32	REPAIR 33	DEFECT LOCATION 34	DEFECT LENGTH
During 100 Percent Proof Load Cycle Test Cases B and E Failed To Achieve 100% Load.			

CAUSE AND CORRECTIVE ACTION DATA

CAUSE
HYDRAULIC SYSTEM PERFORMANCE COULD NOT SUPPORT THE RAMPING OF LOADS.

CORRECTIVE ACTION
HYDRAULIC SYSTEM IS BEING MODIFIED.

CAC 38	CAUSE & CORRECTIVE ACTION ACCEPTANCE	BADGE	DATE 39	PAS CAUSE & CORRECTIVE ACTION REVIEW	BADGE	DATE
	[signature]	583911	3/9/96	[signature]	881882	3/23/96

DISPOSITION DATA

☑ MRB 41 | DISPOSITION 42
SUBMIT TO ENG. FOR EVALUATION.
[signature] 3-20-96

SHOP STAMP 43	INSP STAMP 44	CUST STAMP
	MSS 228 5/22/96	

VISUAL INSPECTION 46		PROD OPS X-RAY 4	
ACCEPT	REJECT	ACCEPT	REJECT

WELDER 48	PA X-RAY 4	
	ACCEPT	REJECT

WELD WIRE ACCEPTANCE 50	PENETRANT	
	ACCEPT	REJECT

REPAIR PER SRI W-001 52	WELD WIRE LAB TICKET 53
☐ I ☐ II ☐ III	
PCN 54	WELD WIRE LOT NUMBER 55

MR CB 56	LAB / LICALL 57	SRI NUMBER 58	NUMBER OF ATTACHMENTS 59	NUMBER OF NCSDs 60
3			(1) 2 3 4 5 6 7 8 9 10 ___	(1) 2 3 4 5 6 7 8 9 10 ___

MAF/MMA 37-033A (12/93)

COPY 1

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE 3
N0034 57	2	2

BLOCK 42 CONT'D

SEE ITEM 1, PG 2 LINES 3-12 FOR DISPOSITION.

STRESS MRB: Glen Wadge 3-22-96
PA&A/MRB [signature] 3-22-96
NASA S&E: [signature] 3-22-96
NASA SEMA: James T. Hawkins 3-22-96

BLOCK 42 CONT'D
ALL WORK DISPOSITION ON THIS NCD IS COMPLETED AND ACCEPTABLE WITHHELD TAG HAS BEEN REMOVED AND DISTROYED.

P.R. B. Lampe 5/22/96 MSS 228

MAF/MMA 37-028 (12/93)

COPY 1

NCID NONCONFORMANCE ITEM DATA

NCD NUMBER A1	ITEM A2	PAGE
N0034517	3	1

ITEM INITIATION DATA

ITEM 1	PART NUMBER 2	TRACEABILITY NUMBER 3	LOT QTY 4	QTY REJ 5	UOM
3	809V400202D-007	0000000082	1	1	

PART NAME 7	PI NUMBER 8	STEP NO 9	SHEET / ZONE / VIEW 10	CA TYPE
LH2 Tank Proof		0030		I/D

DEFECT CODE 12	HDWR CODE 13	CC 14	EE BADGE 15	FAILURE 16	CRIT 17	DEPT FND 18	DEPT LBL 19	SCC 20	WELD CODE 21	WELD GRD
TFD00DTATP		TE		Y (N)		3681	3611			

INITIATED BY	BADGE	DATE 29	WELD TYPE 23	ORIG WELD TOOL 24	DETECT METHOD
[signature]	82180	3-28-96	TIG / VPPA		☐ VISUAL

VALIDATED BY	BADGE	DATE 30	MATERIAL THICKNESS 26 ACTUAL	DRAWING	DEFECT LOC 27	☐ X-RAY
[signature]	66886	3-29-96			ISL / OSL	

RELIABILITY ASSURANCE	BADGE	DATE 31	REP ATTEMPT 28	☐ PENETRANT
			ISL / OSL	

DISCREPANCY DESCRIPTION 32	REPAIR 33	DEFECT LOCATION 34	DEFECT LENGTH

During 100 Percent Proof Pressure and 100 Percent Hydraulic Loading The Actual Test Time was 1 Hour and 16 Minutes. Drawing Requirements: Should Not Be Greater Than 30 Minutes. Ref. TP-14D101-PT ▷ SEE ATTACHMENT 3-1

CAUSE AND CORRECTIVE ACTION DATA

CAUSE: THE SYSTEM WAS NOT TESTED TO RAMP UP LOADS AT 1% PER SECOND.

CORRECTIVE ACTION: SYSTEM IS BEING MODIFIED TO ALLOW COMPLIANCE TO REQUIREMENT

CAC 38	CAUSE & CORRECTIVE ACTION ACCEPTANCE	BADGE	DATE 39	PA&A CAUSE & CORRECTIVE ACTION REVIEW	BADGE	DATE
	[signature]	83341	7/9/96	[signature]	85182	7/23/96

DISPOSITION DATA

☑ MRB 41 | DISPOSITION 42: SUBMIT TO CRB FOR EVALUATION.

[signature] 3-29-96

SHOP STAMP 43	INSP STAMP 44	CUST STAMP
	MSS 225 5/22/96	

VISUAL INSPECTION 46		PROD OPS X-RAY	
ACCEPT	REJECT	ACCEPT	REJECT

WELDER 48	PA X-RAY	
	ACCEPT	REJECT

WELD WIRE ACCEPTANCE 50	PENETRANT	
	ACCEPT	REJECT

REPAIR PER SRI W-001 62	WELD WIRE LAB TICKET 6
☐ I ☐ II ☐ III	
PCN 54	WELD WIRE LOT NUMBER 6

MR CD 56	LAB / LICALL 57	SRI NUMBER 58	NUMBER OF ATTACHMENTS 59	NUMBER OF NCSDs 6
3			(1) 2 3 4 5 6 7 8 9 10 ___	(1) 2 3 4 5 6 7 8 9 10 ___

MAF/MMA 37-033A (12/93)

COPY 1

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE 3
N003457	3	2

Block 42 cont
Item 3
The time exceedance for proof test does not affect the adequacy of the proof test or the form, fit or function of the tank. Areas that are proof tested by pressure only are not affected by the hold time. Areas that are proof tested by the combination of applied load and pressure are over proofed for pressure only and the time at pressure will not invalidate the proof. The 30 minute limit reduces the risk of failure in prog
Disposition is Use-As-Is.
Review by Fracture Control Board is not required.

MATERIALS Sc. FC MRB Norman [illegible] 4/1/96
Gale Copeland 4/1/96

BLOCK 42 CONT'D

CONCUR WITH ABOVE DISPOSITION. MS. UNAFFECTED. ALSO, ADDITIONAL POST PROOF INSPECTION REQUIREMEN IN FORWARD DOME OIL CAN REGION ARE SPECIFIED IN NCD N013904.

STRESS MRB: [illegible] 4-1-96
PAE/MRB: [illegible] 4/2/96

BLOCK 42 CONT'D
THIS NCD HAS BEEN REPLANNED VIA REDLINE STEP 0004 INTO MPP 80914004000-020, ~~W/O # 39155~~ ~~AHL~~ 4/1/96 W/O # 391750.

MFG ENGR, [illegible] 4/1/96
PRODUCT ASSURANCE [illegible] 4/4/96

Block 42 Cont'd.
Concur w/ lines 3-14 & 21-24 above Nasa Systems Engineer [illegible] 4/4/96

MAF/MMA 37-028 (12/93)

COPY 1

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE 3
N 0 0 3 4 5 7	3	3

1 BLOCK 42 CONT'D. THIS ITEM IS SUBMITTED TO ENG. TO
2 ADDRESS MINOR WAIVER PROCESSING FOR TM04K-B VIOLATION REF.
3 PARA 2.3.1.2 OF TM04K-B
4 PA&A/MRB [signature] 4/12/96
5
6
7 BLOCK 42 CONT'D
8
9 THIS NCD TO BE HELD OPEN PENDING RESULTS
10 OF SPECIAL INVESTIGATION SI-96-S008.
11
12 STRESS MRB: [signature] 4-12-96
13 Block 42, Cont.
14 See Item 1, Page 3, Lines 14 to 19
15 [signature] Reliability Assurance 4/15/96
16
17
18 ~~BLOCK 42 CONT'D~~ [signature] 5-15-96
19
20 BLOCK 42 CONT'D
21 ALL WORK DISPOSITION ON THIS NCD IS COMPLETED
22 AND AND ACCEPTABLE WITHHELD TAG HAS BEEN REMOVED
23 AND DISTROYED.
24 P. A. B. [signature] 5/22/96 MS 228
25
26
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30
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MAF/MMA 37-028 (12/93)

COPY 1

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE 3
N0034 57	3	4

BLOCK 42 CONT'D

The final disposition for this NCD is use as is. Form fit, and function not adversely affected. M.S. unaffect
The rationale for this disposition is given in item 3 page 2 lines 3-18. Special Investigation SI-96-5008 has concluded that the exceedance of the proof pressure time limit ~~had no effect~~ & did not cause the post proof cracks near the H2 and H3 welds.

Minor waiver # N003457 has been written for items 1 and 3 for violation the proof pressure time limit. The waiver was written against TM04K-B paragraph 2.3.1.2.

STRESS MRB: Glen Wadge 5-15-96
PA&A/MRB [signature] 5-15-96
NASA S&MA: James T. Hawkins 5-15-96
NASA S&E: SA Whipp 5/15/96

96/OD/0284 CONTRACTS [signature] 5/17/96

MAF/MMA 37-028 (12/93)

COPY 1

3.6 TEST LOAD SEQUENCE

3.6.1 PROOF LOAD SEQUENCE

The proof test of the LH_2 tank shall proceed as follows, see also Table and Figure 4.

1. The loading jacks are at the "zero" load condition as defined in Section 3.4.
2. As a preliminary leak check on the mechanical connections in the pressurization system and on the complete tank as an assembled unit a mini-proof test using gaseous nitrogen pressure alone shall be conducted. For this purpose an initial pressure not to exceed 15 psig shall be applied to the tank. Upon reaching the targeted pressure, the tank shall be depressurized to 2/3 or less of this value to allow for inspection by personnel within the test facility.
3. Following leak checking, tank pressure shall be raised to at least 40% and not more than 50% of the required proof pressure. At this time the hydraulic loading jacks may be exercised to loads not higher than 10% of those defined in Table II for Conditions A, B, C, D, and E.
4. Following completion of Step 3 above, full proof test proper will begin. During this portion of the test the tank pressure shall be increased from the 80% level to 100% in a period of 5 minutes or less. In 30 minutes or less at full proof pressure, the hydraulic jack loading conditions A, B, C, D, and E per Table II shall be applied to the tank. Following each loading condition the jacks shall be returned to the "zero" load condition prior to proceeding. Upon completion of this test sequence the tank shall be depressurized

ATT 1-2
Pg 2 of

3.3 PRESSURIZATION SYSTEM

For pressurization of the tank, gaseous nitrogen shall be introduced through the electrical feed thru opening and through the vent valve opening in the forward dome cap, see Figure 1. The gaseous nitrogen used for proof testing shall conform to specification MIL-P-27401, "Propellant Gas-GN_2".

All plumbing to the tank shall be designed to impose a minimum of loadi on the tank outlets and fittings. The maximum allowable limit loads due to pressure and relative deflection and alignment of the tank and test equipme on the forward dome vent and electrical feed through openings are outlined in Table Ib.

Tank pressure will be maintained between 38.6 psig and 39.4 psig for

(F) LWT 1, 2, 3, and 38.8 and 39.4 psig for LWT 4 and up for full proof pressur

The tank temperature shall be maintained between 40°F and 120°F wheneve tank pressure is between 80% and 100% of full proof pressure or when jack loadings are applied. For pressures above 38.6 psig tank pressures must be within the limits defined in Figure 4. At all other times during proof tesi operations the tank temperature shall not exceed 140°F.

During proof test operations, the time spent above 80% of required proof pressure shall be minimized to the greatest extent possible. No more than 5 minutes shall be used to raise tank pressure from 80% to 100% of required proof pressure or to lower it from 100% to 80%. Full proof pressure shall n be held for a period of over 45 minutes. The cumulative time that any tank may be pressurized above 60% of full proof pressure shall not exceed 150 minutes. Neither the tank nor any flight hardware which is not qualified as a designated test tool may be exposed to more than 10 cycles as defined in Figure 5.

Position #3 Station 2

NCD NONCONFORMANCE DOCUMENT

MRB ☒

N 015812

DOCUMENT INITIATION DATA

N 015812

ASSY/DETAIL PART NUMBER: 8097111841 3-029	a TRACEABILITY NUMBER: 000003776 00	b ORDER TYPE/NUMBER: 377600			
ASSY/DETAIL PART NAME: INTERTANK FOAM TEST AND TRIM	d PROJECT: (ET) COMM	e EFFECTIVITY: LWT-082	f CTRL PT: 1	g GFP: Y / G	
SUPPLIER CODE: i	SUPPLIER NAME:	j ORIGINATION LOCATION: VAB	k TAIR BOOK (BK/PG):		
INITIAL REPORT: m	REFERENCE DOCUMENT(S): 8097111841 3-029 ØP2				

ITEM INITIATION DATA

ITEM 1	PART NUMBER 2	TRACEABILITY NUMBER 3	LOT QTY 4	QTY REJ 5	UOM
1	8097111841 3-029	000003776 00	1	1	

PART NAME 7	PI NUMBER 8	STEP NO 9	SHEET / ZONE / VIEW 10	CA TYPE
INTERTANK FOAM TEST AND TRIM	1535	00300035	42-3E FLAT	I / D

DEFECT CODE 12	HDWR CODE 13	CC 14	EE BADGE 15	FAILURE 16	CRIT 17	DEPT FND 18	DEPT LBL 19	SCC 20	WELD CODE 21	WELD GRD
NCT C FAT A	FIAB	IP		Y / (N)		3681	3614			

INITIATED BY	BADGE	DATE 29	WELD TYPE 23	ORIG WELD TOOL 24	DETECT METHOD
Curtiss E. Dossett	84514	1-25-96	TIG / VPPA		☐ VISUAL
VALIDATED BY: JERRY CAMPBELL	BADGE 99661	DATE 30 1-25-96	MATERIAL THICKNESS 26: ACTUAL / DRAWING	DEFECT LOC 27: ISL / OSL	☐ X-RAY
RELIABILITY ASSURANCE	BADGE	DATE 31		REP ATTEMPT 28: ISL / OSL	☐ PENETRANT

DISCREPANCY DESCRIPTION 32 | REPAIR 33 | DEFECT LOCATION 34 | DEFECT LENGTH

The Lead-out Plug-Pull Failed At 16.3 PSI, 30.0 PSI Reqd.
The +Y Fwd Flange Plug-Pull Failed At 22.9 PSI, 30.0 PSI Reqd.
Both Pull's Are At +Y Location
Ref. Lab. # 96HB505 And 96HB507

CAUSE AND CORRECTIVE ACTION DATA

CAUSE

CORRECTIVE ACTION

CAC 38	CAUSE & CORRECTIVE ACTION ACCEPTANCE	BADGE	DATE 39	PA CAUSE & CORRECTIVE ACTION REVIEW	BADGE	DATE
1	[signature]	66686	2-1-96	[signature]	80457	3/11/9

DISPOSITION DATA

☒ MRB 41 | DISPOSITION 42:

SUBMIT TO TPS ENGINEERING AND QUALITY ENGINEERING FOR DETERMINATION OF "NO TEST" ON PLUGS PRIOR TO DISPOSITIONING.

PA JERRY CAMPBELL 1/25/96

SHOP STAMP 43	INSP STAMP 44	CUST STAMP
3-5-96 R82688	MSS 133 3-5-96	

VISUAL INSPECTION 46		PROD OPS X-RAY	
ACCEPT	REJECT	ACCEPT	REJECT
WELDER 48		PA X-RAY	
		ACCEPT	REJECT
WELD WIRE ACCEPTANCE 50		PENETRANT	
		ACCEPT	REJECT

REPAIR PER SRI W-001 52: ☐ I ☐ II ☐ III | WELD WIRE LAB TICKET

PCN 54 | WELD WIRE LOT NUMBER

MB CD 56	LAB / LICALL 57	SRI NUMBER 58	NUMBER OF ATTACHMENTS 59	NUMBER OF NCSDs
6			(1)(2)(3)(4)(5)(6)(7) ~~8 9 10~~ 28	(1)(2)(3)(4) ~~5 6 7 8 9 10~~

DOCUMENT CLOSURE DATA

DISP CODE	NUMBER OF ITEMS p	TRANSFER TO DOCUMENT q	PRODUCTION OPERATIONS CLOSURE ACCEPTANCE	BADGE	DATE
N/M F C	(1)(2) ~~3 4 5 6 7 8 9 10~~		[signature]	58341	3-5-96

QC SUPERVISOR CLOSURE ACCEPTANCE	BADGE	DATE	CUSTOMER CLOSURE ACCEPTANCE	DATE
PA JERRY CAMPBELL	99661	3/5/96	N.O. Hays OCMAS	

MAF/MMA 37-033 (8/94)

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER	ITEM	PAGE
N0158 12	1	2

BLOCK 42 CONTD

TWO PLUGS WERE PERFORMED PROPERLY AND ARE FAILURES. PERFORM AN ADDITIONAL PLUG PULL 6" DOWN AND EDGE TO EDGE OF THE ORIGINAL FAILURES. SUBMIT RESULTS TO ENGR FOR EVALUATION AND CLOSE OUT

TPS MATL/MRB [signature] 1-25-96
PAE/MRB: [signature] 1/25/96

Block #42 Cont'd

PER ENG. Disposition Two Additional Plugs were Pulled at Given Location's. Both Plug's meet 1535 Reqm. +Y Fwd Flange Pulled at 44.7 PSI. 30 PSI Req'd. Per. 1535. Lead-out Pulled at 53.3 PSI. 30 PSI Req'd Per. 1535 SEE Attachment Number Two. Lab. # 96HB508

P.A. [signature] 1-26-96

Block 42 cont'd.

Re-submit to Engineering with requested information for evaluation and further disposition.

PA JERRY CAMPBELL [signature] 1/26/96

MAF/MMA 37-028 (12/93)

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE
N01581 2	1	3

BLOCK #42 CONT'D

FINAL DISPOSITION FOR THIS ITEM WILL BE RELEASED AFTER REVIEW OF ALL PLUG PULL RESULTS (SEE ITEM 2 OF THIS NCD).

MRB/ENG. LIAISON: J. Hanna 1/29/96
PAE/MRB: [signature] 1/29/96

BLOCK #42 CONT'D

BASED ON CONFORMING RE-TEST RESULTS THIS MATERIAL APPLICATION IS ACCEPTABLE TO ENGINEERING. FORM, FIT AND FUNCTION IS NOT ADVERSELY AFFECTED. "USE AS IS".

REPAIR PLUG PULL HOLES PER STP/PI 1518 AND TRIM TO DRAWING REQUIREMENTS. AFTER ACCEPTABLE REPAIR FORM, FIT AND FUNCTION IS NOT ADVERSELY AFFECTED.

INK MARK NCD NUMBER AT THIS LOCATION PER STP/PI 4501 USING .25 INCH HIGH CHARACTERS.

MRB/ENG. LIAISON: J. Hanna 1/29/96
PAE/MRB: [signature] 1/29/96
NASA/MRB H.O. Hays 29 JAN 96

BLOCK 42 CONT'D

UTILIZE RAM 4501/1518 ATTACHMENTS AS REQUIRED
QC ADDRESS POSSIBLE CEL VIOLATION
PAE/MRB: [signature] 1/29/96

MAF/MMA 37-028 (12/93)

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER	ITEM	PAGE
N01581 2	1	4

BLOCK 32 CONT'D.

THIS IS A VIOLATION OF C.I.L. FIND NUMBER CI-T-62135.04. SUBMIT TO CONTRACTS FOR WAIVER CONSIDERATION.

PA JERRY CAMPBELL 1/29/96

BLOCK #42 CONT'D

SEE ATTACHMENT 1-3 OF THIS NCD FOR ADDITIONAL RATIONALE FOR "USE AS IS" AND ATTACHMENT 1-4 FOR MINOR WAIVER.

MRB/ENG. LIAISON: T. Hamm 1/29/96

Contracts - Troy Ohlsen

96/OD/0071

MAF/MMA 37-028 (12/93)

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE
N01518112	1	5

Block #42 Cont'd
PRIMER TOUCHUP HAS BEEN PREFORMED PER
P.I. 3004 ATTACHMENT NUMBER 1-5

P.A. Gustave E. Dossetto 3-5-96

Block #42 Cont'd
PLUG PULL HOLES HAVE BEEN REPAIRED PER ENG
Disposition and P.I 1518 ATTACHMENT NUMBER 1-6

P.A. Gustave E. Dossetto 3-5-96

Block #42 Cont'd
PER ENG DISPOSITION NCD NUMBER HAS BEEN
APPLIED PER 4501 ATTACHMENT # 1-7

P.A. Gustave E. Dossetto 3-5-96

Block #42 Cont'd
ALL WORK DISPOSITIONED PER THIS NCD ITEM
NUMBER ONE IS COMPLETE AND ACCEPTABLE. WITH-HELD TAG
HAS BEEN REMOVED AND DESTROYED.

P.A. Gustave E. Dossetto 3-5-96

MAF/MMA 37-028 (12/93)

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE
N/0/58/1/2	1	6

Blocks 6 and 3 cont'd
Change to: 396270

BLOCK 42 CONT'D: IT IS ACCEPTABLE TO ADD THE ABOVE INFORMATION TO THIS CLOSED NCD.
PAE MRB: [signature] 3/20/97

MAF/MMA 37-028 (12/93)

NCD NO N015812
ITEM 1
ATTACHMENT 1-3
PAGE 1 OF 1

ADDITIONAL INFORMATION FOR THE USE AS IS DISPOSITION AND MINOR WAIVER.

WHILE THE PLUG PULL TEST IS AN ACCEPTABLE PROCEDURE FOR VERIFYING THE ADHESION OF A MATERIAL TO THE SUBSTRATE IT IS NOT INFALLIBLE. DATA GATHERED OVER THE YEARS USING THIS EQUIPMENT HAS SHOWN THAT IT IS OPERATOR SENSITIVE. CUTTING THE COLUMN FREE FROM THE SURROUNDING MATERIAL INDUCES STRESS IN THE TEST COLUMN. BONDING OF THE PULL BUTTON TO THE MATERIAL COLUMN CAN BE OFF CENTER AND INDUCE UNEQUAL LOADING OF THE TEST SAMPLE. IF ADEQUATE CARE IS NOT TAKEN WHEN HOOKING THE BUTTON TO THE PULLER THE COLUMN WILL SEE STRESS BEFORE THE ACTUAL PULL. UNDER THE BEST CONDITIONS USING THE BEST OPERATORS A BUILD UP OF THESE FACTORS CAN CAUSE PREMATURE FAILURE OF GOOD MATERIAL.

DAVID F BURAS
TPS MATERIAL/MRB

EXTERNAL TANK ET89
MINOR WAIVER NO. N015812

MINOR WAIVER DESCRIPTION

DOCUMENT NO.	TITLE	AFFECTED PARA.
CPT01M09A	BASIC ET CONTRACT END ITEM SPECIFICATION PART 2.	C.I.-T-62135.04

SPECIFIED REQUIREMENTS

MINIMUM BOND ADHESON TEST PLUG PULL REQUIREMENT FOR STP/PI 1535 FOAM TO BE 30 P.S.I.

DESCRIPTION OF DEPARTURE FROM REQUIREMENTS

ORIGINAL BOND ADHESION TESTS FAILED AT 16.3 P.S.I. AND 22.9 P.S.I.
RETEST RESULTS CONFORMED AT 53.3 P.S.I. AND 44.7 P.S.I.
SEE ATTACHMENT 1-3 OF THIS NCD FOR ADDITIONAL RATIONALE FOR "USE AS IS" DISPOSITION.

AUTHORIZED MINOR WAIVER FOR ET - 89 (LWT -82)
(Based on Engineering disposition form, fit, or function not affected)

ENGINEERING LIAISON T. Hanson DATE 1/29/96

CONTRACTS Troy Ohlson DATE 1/29/96

NASA SRM&QA / MAF H. O. Hays DATE 29 JAN 96

NASA / MAF / RMO Harald Berezny DATE 1-30-96

DPRO / ACO Joseph G. Connelly DATE 1-31-96

MAF/MMA 33-047 (11/90)

LWT 82

Thermal Protection Systems Test Repor

JCB NO. 96 HB 507 (1)	DATE 1-25-96 (2)		
PRIORITY (3)	P.O. NO. (4)		
DESCRIPTION/PART NO./VENDOR (5)		LOT NO. (15)	TEST RESULTS (2
L/N 377600 8097111841 3-029012		COMP A (16)	Does meet / Does not mee
S/N 00000 377600		COMP B (17)	CHEMICAL
Step 0035		MFG DATE (18)	MECHANICAL ✓
			INFORMATION ONLY

FROM Pos 3 Sta. 2 (6)	SPEC NO. 1535 (7)	SAMPLE MACHINED BY N/A	DIGITAL BALANCE NO. (2
QUANTITY RECD (8)	NO. SAMPLES SENT TO LAB (9)	SAMPLE BONDED BY	CAL DUE N/A
SUBMITTED BY M. Howard (10)	EXT. (11) STAMP MSS 133 (12)	BUTTON BONDED BY 81142 1-24-96	PORTA-PULL TEST NO. ST00244
RAP DATE 1-25-96 (13)		BOND TENSION TEST BY R82688 1-25-96	CAL DUE 3-26-9

REMARKS (14)

Plug Pull on tank

24 Hr. cure 12/22/95 1510 Hrs.

REMARKS (2

DOES NOT CONFORM TO 1535 REQ.

JERRY CAMPBELL (30)

APPROVED 1/25/96

MIXED COMPONENTS TEST (19)

	RESULTS	RQMTS
CREAM TIME		
DENSITY (FREE FOAM)		
GEL TIME		
HARDNESS		
POT LIFE		
GE LIFE		
CK FREE		
WT/GAL		

CHEMICAL TESTS

	RESULTS (20)		REQUIREMENTS (2	
	COMP A	COMP B	COMP A	COMP B
AMINE EQ				
FREON CONTENT				
HYDROXYL NO.				
PHOSPHORUS CONTENT				
REFRACTIVE INDEX				
SPECIFIC GRAVITY				
VISCOSITY				
WATER CONTENT				
ACID NO.				

MECHANICAL TEST

DENSITY (SPRAYED) AND/OR COMPRESSIVE STRENGTH (22)

SPECIMEN	LENGTH	WIDTH	AREA	THICK	VOLUME	WEIGHT	LOAD	DENSITY	PSI	REQD	HARDNESS

TENSILE OR LAP SHEAR STRENGTH AND/OR ELONGATION (23) FAILURE MODE (24)

SPECIMEN	AREA	LOAD	PSI	ELONGATION	REQD	%ADH	%COH	%K/L	NO. OF K/L
+Y Fwd flange	1"		22.9		30PSI		100		

TEST COMMENTS (25)

N015812
ATT # 1-1
SHT 2 OF 2

01/25/96

MSS 133

(26)

LAB TEST ENGINEER

WT 82

Thermal Protection Systems Test Report

JOB NO. 96 HB 505 (1)	DATE 1-25-96 (2)
PRIORITY (3)	P.O. NO. (4)

DESCRIPTION/PART NO./VENDOR (5)
L/N 377600 8097111841/3-0290P2
S/N 0000037760
Step 0030
Lead OUT

FROM Pos 3 Sh 2-3681 (6)	SPEC NO. 1535 (7)
QUANTITY RECD (8)	NO. SAMPLES SENT TO LAB (9)
SUBMITTED BY M. Howard (10)	EXT. 2-0605 (11) STAMP MSS 133 (12)
RAP DATE 1-25-96 (13)	

REMARKS (14)
Plug
Pull on tank
24 Hr. cure 12/22/95 1510 Hrs.

LOT NO. (15)	TEST RESULTS (27)		
COMP A (16)		Does meet	Does not meet
COMP B (17)	CHEMICAL		
MFG DATE (18)	MECHANICAL		✓
	INFORMATION ONLY		

SAMPLE MACHINED BY N/A — DIGITAL BALANCE NO. N/A (28)
SAMPLE BONDED BY — CAL DUE
BUTTON BONDED BY B1143 1-24-96 — PORTA-PULL TEST NO. 5100245 1/24/96
BOND TENSION TEST BY R82668 1-25-96 — CAL DUE 3-26-96

REMARKS (29)
DOES NOT CONFORM TO 1535 REQ.
JERRY CAMPBELL (30)
APPROVED 1/25/96

MIXED COMPONENTS TEST (19)

	RESULTS	RQMTS
CREAM TIME		
DENSITY (FREE FOAM)		
GEL TIME		
HARDNESS		
POT LIFE		
GE LIFE		
CK FREE		
WT/GAL		

CHEMICAL TESTS	RESULTS (20) COMP A	RESULTS (20) COMP B	REQUIREMENTS (21) COMP A	REQUIREMENTS (21) COMP B
AMINE EQ				
FREON CONTENT				
HYDROXYL NO.				
PHOSPHORUS CONTENT				
REFRACTIVE INDEX				
SPECIFIC GRAVITY				
VISCOSITY				
WATER CONTENT				
ACID NO.				

MECHANICAL TEST

DENSITY (SPRAYED) AND/OR COMPRESSIVE STRENGTH (22)

SPECIMEN	LENGTH	WIDTH	AREA	THICK	VOLUME	WEIGHT	LOAD	DENSITY	PSI	REQD	HARDNESS

TENSILE OR LAP SHEAR STRENGTH AND/OR ELONGATION (23) — FAILURE MODE (24)

SPECIMEN	AREA	LOAD	PSI	ELONGATION	REQD	%ADH	%COH	%K/L	NO. OF K/L
L/O	1"		16.3		30 PSI		100		

TEST COMMENTS (25)

N015812
ATT 1-1
SHT 1 OF 2

1-25-96
MSS 133

(26)
LAB TEST ENGINEER

MAF/MMA 37-137 (11/94)

POS-III STA II LWT-082

Thermal Protection Systems Test Report

JOB NO. 96HB508 (1)	DATE 1-26-96 (2)		
PRIORITY (3)	P.O. NO. - (4)		
DESCRIPTION/PART NO./VENDOR LWT-082 (5) 8097111 8413-029 OP1 STEP 35 L/N 377600 NCP II N015812			
FROM POS III STA II (6)	SPEC NO. 1535 (7)		
QUANTITY RECD (8)	NO. SAMPLES SENT TO LAB (9)		
SUBMITTED BY T. HARPER (10)	EXT. 2-0605 (11)	STAMP MSS 133 (12)	
RAP DATE 1-26-96 (13)			
REMARKS (14) FWT ON TANK 24 HR CURE COMP. 1510 HRS 12/22/95			

LOT NO. (15)	TEST RESULTS (27)		
COMP A (16)		Does meet	Does not meet
COMP B (17)	CHEMICAL		
MFG DATE (18)	MECHANICAL	✓	
	INFORMATION ONLY		

SAMPLE MACHINED BY 81138	1-26-96	DIGITAL BALANCE NO. N/A	(28)
SAMPLE BONDED BY 81138	1-26-96	CAL DUE	
BUTTON BONDED BY 81138	1-26-96	PORTA-PULL TEST NO. ST00245	
BOND TENSION TEST BY 81138	1-26-96	CAL DUE 3-26-96	

REMARKS (29)
MEETS 1535 REQM.
MSS 133 1-26-96
C. P. Dossett (30)
APPROVED

MIXED COMPONENTS TEST (19)

	RESULTS	RQMTS
CREAM TIME		
DENSITY (FREE FOAM)		
GEL TIME		
HARDNESS		
POT LIFE		
TAGE LIFE		
TACK FREE		
WT/GAL		

CHEMICAL TESTS	RESULTS (20)		REQUIREMENTS (21)	
	COMP A	COMP B	COMP A	COMP B
AMINE EQ				
FREON CONTENT				
HYDROXYL NO.				
PHOSPHORUS CONTENT				
REFRACTIVE INDEX				
SPECIFIC GRAVITY				
VISCOSITY				
WATER CONTENT				
ACID NO.				

MECHANICAL TEST

DENSITY (SPRAYED) AND/OR COMPRESSIVE STRENGTH (22)

SPECIMEN	LENGTH	WIDTH	AREA	THICK	VOLUME	WEIGHT	LOAD	DENSITY	PSI	REQD	HARDNESS

TENSILE OR LAP SHEAR STRENGTH AND/OR ELONGATION (23) FAILURE MODE (24)

SPECIMEN	AREA	LOAD	PSI	ELONGATION	REQD	%ADH	%COH	%K/L	NO. OF K/L
TY FWD	1"		44.7		30		100		
LEAD OUT	1"		53.3		30		100		

TEST COMMENTS (25)

N015812
AH. #12-2
SHT 1 OF 1

MSS 133 1-26-96

(26)
LAB TEST ENGINEER

MAE/MMA 37-127 (11/94)

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1

PART NUMBER: RAM-3004-011

MFG. ENGR: GRAY DATE: 03/08/94
Q.A. ENGR: K. MADDOX DATE: 09/30/94

MPP TYPE: RAM
EFFECTIVITY: N/A

PART NAME: EPOXY PRIMER TOUCHUP, TANK

ENGR. CHG. LEVEL: N/A
SERIALIZED ITEM: NO
SCID ITEM: NO
CONTROL POINT: (ALL)
SAFETY HAZARDS INVOLVED: YES

NOTES:

LEVEL 1 GRAPHICS REQIRED: NO

SEQUENCE CRITICAL STEPS - NO

INDEX DATA

LIST OF SUPPORT DOCUMENTS
GENERAL NOTES/SAFETY WARNINGS/CAUTIONS
OPERATIONS SHEETS
RECORD OF REVISIONS

THIS REWORK ATTACHMENT CAN BE USED WITH A NON-CONFORMANCE DOCUMENT (NCD) AND/OR AN IN-PROCESS REWORK AUTHORIZATION SHEET (IPRAS). RECORD (AS APPLICABLE):

IPRAS/NCD NUMBER N015812 ITEM NUMBER ONE

ATTACHMENT NUMBER 1-5 MPP NUMBER 8097111841 3-029

ORDER NUMBER 377600

NOTE: THE SYMBOL (G) ANNOTATED BY ANY STEP IN THIS DOCUMENT REPRESENTS THE POSSIBILITY OF A GOVERNMENT MANDATORY INSPECTION POINT (GMIP).

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: RAM-3004-011

GENERAL NOTES/SAFETY WARNINGS/CAUTIONS

SAFETY NOTICE

1. THIS PROCESS CONTAINS HAZARDOUS STEPS. IT IS MANDATORY THAT ALL PERTINENT SAFETY PRECAUTIONS BE REVIEWED AND THAT PRESCRIBED PERSONNEL PROTECTIVE EQUIPMENT (PPE) BE WORN AS INDICATED IN THE SAFETY STATEMENTS. REVIEW ALL PERTINENT CAUTION STATEMENTS FOR POTENTIAL HARDWARE DAMAGE CONCERNS.

2. WHERE THE SAFETY PRECAUTIONS ARE NOT FULLY UNDERSTOOD, OR WHERE PPE IS PRESCRIBED, THE LEVEL II TIE CODE WILL BE USED TO VIEW THE COMPLETE VERSION OF THE SAFETY STEP. THE AREA SUPERVISOR IS RESPONSIBLE FOR ENFORCEMENT OF THESE REQUIREMENTS.

3. OBSERVERS, INSPECTORS AND SUPERVISORY PERSONNEL WHO PARTICIPATE IN HAZARDOUS OPERATIONS AND ARE SUBJECTED TO THE SAME HAZARDS AS THE OPERATORS, SHALL WEAR THE PPE IDENTIFIED AS REQUIRED FOR HAZARDOUS OPERATIONS.

4. ALL PERSONNEL WORKING ABOVE OTHER PERSONNEL AND/OR FLIGHT HARDWARE SHALL USE TETHERED TOOLS AND EQUIPMENT. SUPERVISORS WILL ENFORCE THE TETHERING REQUIREMENT.

5. OBSERVE WALKING LOAD LIMITATIONS PER DWG 80900000031 WHILE WORKING ON OR IN THE ET.

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: RAM-3004-011

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
R82959 3/4/96	SHOP	0015	(P3004-12A-02) MASK AS NEEDED FOR PRIMER APPLICATION. IF MASKING NOT NEEDED, N/A THE STEP. (3004-12A-02)
R82959 3/4/96	SHOP	0020	(P3004-12A-03) OBTAIN MIXED PRIMER. RECORD THE FOLLOWING DATA: PRIMER TYPE (3004/7001): 3004 DATE/LOT CODE NO.: G-03046 POT LIFE EXPIRATION: TIME: 0440 DATE: 3/5/96 (3004-12A-03)
			CAUTION SKIN OIL - CONTAMINATION HAZARD (PROTECTIVE EQUIPMENT MANDATORY) (SCHW021-2)
			WARNING EPOXY PRIMER AND/OR SOLVENT REDUCER (SPRAY OPERATIONS) - EYE AND/OR SKIN IRRITATION HAZARD, RESPIRATORY HAZARD AND FIRE HAZARD (PERSONAL PROTECTIVE EQUIPMENT MANDATORY) (SWTC030-2)
			WARNING EPOXY PRIMER (NON SPRAY OPERATIONS) - EYE AND/OR SKIN IRRITATION HAZARD, RESPIRATORY HAZARD AND FIRE HAZARD (PERSONAL PROTECTIVE EQUIPMENT MANDATORY) (SWTC029-2)
			WARNING EPOXY PRIMER (NON SPRAY - MINOR APPLICATIONS) - EYE AND/OR SKIN IRRITATION HAZARD (PERSONAL PROTECTIVE EQUIPMENT MANDATORY) (SWTC159-2)
R82959 3/4/96	SHOP	0025	(P3004-12A-03) APPLY PRIMER TO THE REQUIRED SURFACES. RECORD THE FOLLOWING DATA: ENVIRONMENT TEMP.: 72 RELATIVE HUMIDITY: 42 % APPLICATION DATE: 3/4/96 TIME: 1500 (3004-12A-03)
R82688 3-5-96	SHOP	0030	(P3004-11A-04) SELECT THE CURE METHOD. N/A CURES THAT ARE NOT USED.
			1) CURE THE PRIMER AT AMBIENT (65 °F MINIMUM) FOR 16 MINIMUM. RECORD THE FOLLOWING: CURE START DATE: 3-4-96 TIME: 1500 Hrs TEMP: 72° CURE FINISH DATE: 3-5-96 TIME: 0700 Hrs TEMP: 73°

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: RAM-3004-011

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS

ADHESION

DRY TAPE TEST, OPTIONAL

NOTE: AREAS ON PARTS WHICH HAVE COMPOUND OR SMALL RADIUS OF CURVATURE, BOLT HOLES, SHARP EDGES TYPICAL OF WELD LANDS, AND SIMILAR AREAS WHERE PRIMER THICKNESS MEASUREMENTS ARE NOT ACCURATE OR FEASIBLE SHALL BE VISUALLY INSPECTED FOR COMPLETE COVERAGE. THESE AREAS ARE ACCEPTABLE WHEN COVERED WITH PRIMER AS JUST DESCRIBED. BOLT HOLES OPENINGS SHALL MEET ENGINEERING DRAWING TOLERANCES.

96500 N/A 3-5-94
SHOP
0050 (P3004-12B-03) PERFORM DRY TAPE TEST. N/A IF NOT REQUIRED (3004-12B-03)

MSS 133 N/A 3-5-94
QCPC
0051 WITNESS DRY TAPE TEST. PASS_____ FAIL_____ (N/A IF NOT REQUIRED.) (QRP/08-17-2)

WET TAPE TEST, MANDATORY OVER 5 SQ. IN.

96500 N/A 3-5-94
SHOP
0055 (P3004-12B-04) PERFORM WET TAPE TEST. N/A IF NOT REQUIRED. (3004-12B-04)

MSS 133 N/A 3-5-94
QCPC
(G) 0056 WITNESS WET TAPE TEST. PASS_____ FAIL_____ (N/A IF NOT REQUIRED). (QRP/08-18-2)

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: RAM-4501-016

GENERAL NOTES/SAFETY WARNINGS/CAUTIONS

SAFETY NOTICE

1. THIS PROCESS CONTAINS HAZARDOUS STEPS. IT IS MANDATORY THAT ALL PERTINENT SAFETY PRECAUTIONS BE REVIEWED AND THAT PRESCRIBED PERSONNEL PROTECTIVE EQUIPMENT BE WORN AS INDICATED IN THE SAFETY STATEMENTS. REVIEW ALL PERTINENT CAUTION STATEMENTS FOR POTENTIAL HARDWARE DAMAGE CONCERNS.

2. WHERE THE SAFETY PRECAUTIONS ARE NOT FULLY UNDERSTOOD, OR WHERE PERSONNEL PROTECTIVE EQUIPMENT IS PRESCRIBED, THE LEVEL II TIE CODE WILL BE USED TO VIEW THE COMPLETE VERSION OF THE SAFETY STEP. THE AREA SUPERVISOR IS RESPONSIBLE FOR ENFORCEMENT OF THESE REQUIREMENTS.

3. OBSERVERS, INSPECTORS AND SUPERVISORY PERSONNEL WHO PARTICIPATE IN HAZARDOUS OPERATIONS AND ARE SUBJECTED TO THE SAME HAZARDS AS THE OPERATORS, SHALL WEAR THE PROTECTIVE EQUIPMENT IDENTIFIED AS REQUIRED FOR HAZARDOUS OPERATIONS.

4 PERSONNEL SHALL OBEY THE WALKING LOADS REQUIREMENTS OF 80900000031 WHILE WORKING ON OR IN THE ET.

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: RAM-4501-016

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
R82688 3-5-96	SHOP	0005	VERIFY THIS RAM IS THE LATEST REVISION AS INDICATED ON THE RAM LISTING.
MSS 133 3-5-96	QCBC	0006	VERIFY CORRECT REVISION LEVEL. (QCS/02-04-1)
			NOTE: IF THE QC IS USING THIS RAM TO INK STAMP SOFI ANOMALIES THAT ARE STILL VISIBLE AND HAVE BEEN DETERMINED TO BE ACCEPTABLE PER ENG DWG 80900000010 , THEN ALL THE FOLLOWING STEPS EXCEPT 0016 ARE TO BE N/A.
			Note: When numbers or characters are required to be printed, use the step for rough surfaces (if required). When an "X" or optical target is to be marked, use the step for Smooth Surface. Operator shalll determine which of the following methods are to be used, and N/A WHICH OF THE FOLLOWING (2) STEPS ARE NOT USED. (IT IS POSSIBLE TO USE BOTH STEPS)
3-5-96 R82688	SHOP	0010	SURFACE PREPARATION, SMOOTH TPS SURFACE: (P4501-14B-02) DRY WIPE/VACUUM SURFACE TO BE STAMPED/STENCILED. (4501-14B-02)
3-5-96 R82688	SHOP	0015	**WARNING** ABRADING OPERATION - EYE INJURY HAZARD (PERSONAL PROTECTIVE EQUIPMENT MANDATORY) (SWPH032-2) (P4501-14B-03) ABRADE ROUGH TPS SURFACES TO BE STAMPED/STENCILED WITH 180 GRIT OR FINER ABRASIVE PAPER. DRY WIPE/VACUUM. USE CARE TO ENSURE MINIMUM TPS THICKNESS IS MAINTAINED. (4501-14B-03)
MSS 133 3-5-96 N/A	QCBC	0016	**WARNING** ABRADING OPERATION - EYE INJURY HAZARD (PERSONAL PROTECTIVE EQUIPMENT MANDATORY) (SWPH032-2) MARK SOFI ANOMALIES THAT ARE STILL VISIBLE AND HAVE BEEN DETERMINED TO BE ACCEPTABLE PER ENG DWG 80900000010 USING QC STAMP AND BLACK INK, AS APPROPRIATE. (QRG/05-13-1) N/A IF NOT MARKING ANOMALIES.
3-5-96 R82688	SHOP	0020	(4501-14H-03) MARK THE SOFI IN THE AREA AS DIRECTED BY DRAWING OR DISPOSITION USING LUMOCOLOR MARKER. (4501-14H-02) (4501-14H-03)
MSS 133 3-5-96	QCBC	0021	INSPECT TO ENSURE MARKING IS LEGIBLE AND MARKING IS COMPLETE AND ACCEPTABLE. (QRG/05-15-1)

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1

PART NUMBER: RAM-4501-016

RECORD OF REVISIONS

NO.	DCN	AUTHORITY	DATE	ME/QE/PIE/QIE	DESCRIPTION OF CHANGE
NEW		PLNG	09/19/94	(ME) H. GEORGE	CREATED NEW AS A SUBSET OF 4501 FOR TPS.
			09/20/94	(QAE) F.GUTIERREZ	REVIEWED TO LATEST EMD REQUIREMENTS.
			09/26/94	(QIE) D. LANDER	NO INPUT.
1			01/26/95	(QAE) F.GUTIERREZ	REVISED NOTE AFTER QC STEP 0006.
			01/26/95	(QIE) D. LANDER	NO CHANGE.

NCID NONCONFORMANCE ITEM DATA

NCD NUMBER A1	ITEM A2	PAGE
N015812	2	1

ITEM INITIATION DATA

ITEM 1	PART NUMBER 2	TRACEABILITY NUMBER 3	LOT QTY 4	QTY REJ 5	UOM
2	809711184 13-029	000003 77600	1	0	8

PART NAME 7	PI NUMBER 8	STEP NO 9	SHEET / ZONE / VIEW	DISP TYPE 10
INTERTANK FOAM TEST & TRIM	15350	0030/0035	42-3E-FLAT	(X) LD

DEFECT CODE 12	HDWR CODE 13	CC 14	EE BADGE 15	FAILURE 16	CRIT 17	DEPT FND 18	DEPT LBL 19	SCC 20	WELD CODE 21
TSDOUAMTA	FIAB	EC	96549	Y (N)		3681	3681		

INITIATED BY	BADGE	DATE 29	WELD TYPE 23	FOR WELD TOOL 24	DETECT METHOD
Curtiss E. Dossett	84514	1-26-96	TIG/AVPA		VISUAL

VALIDATED BY	BADGE	DATE 30	MATERIAL 25	THICKNESS 26	DEFECT LOC 27	
R. Jerry Campbell	99661	1-26-96				X-RAY

RELIABILITY ASSURANCE	BADGE	DATE 31				
						PENETRANT

DISCREPANCY DESCRIPTION 32	REPAIR 33	DEFECT LOCATION 34	DEFECT LENGTH

EMPLOYEES 81143 AND 82803 THAT CORED THE PLUGS AND BONDED THE BUTTONS FOR THE EIGHT (8) PLUG PULLS ON THE INTERTANK DID NOT HOLD CURRENT D.8 TPS PLUG PULL CERTIFICATIONS.

CAUSE AND CORRECTIVE ACTION DATA

CAUSE

CORRECTIVE ACTION

CAC 38	CAUSE & CORRECTIVE ACTION ACCEPTANCE	BADGE	DATE 39	PA CAUSE & CORRECTIVE ACTION REVIEW	BADGE	DATE
				[illegible]	84457	3/18/96

DISPOSITION DATA

☑ MRB 41	DISPOSITION 42	SHOP STAMP 43	INSP STAMP 44	CUST STAMP
	SUBMIT TO ENGINEERING		MSS 133 3-5-96	

PA JERRY CAMPBELL 1/26/96

VISUAL INSPECTION 46		PROD OPS X-RAY	
ACCEPT	REJECT	ACCEPT	REJECT

WELDER 47		PAX-RAY	
		ACCEPT	REJECT

WELD WIRE ACCEPTANCE 50		PENETRANT	
		ACCEPT	REJECT

REPAIR PER SRM 002 52		WELD WIRE PAS TICKET
☐ I	☐ II	☐ III

PCN 54	WELD WIRE LOT NUMBER

MR CD 56	LAB / LICALL 57	SRI NUMBER 58	NUMBER OF ATTACHMENTS	NUMBER OF NCSDs 59
N/	OE/LOSH/EDC		1 2 3 4 5 6 7 8 9 10 / 2	1 2 3 ~~4 5 6 7 8 9 10~~

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE
N01581 2	2	2

BLOCK 32 CONT'D.

THE EMPLOYEE, 82688, THAT PERFORMED ACTUAL PLUG PULL WAS CERTIFIED. BOTH EMPLOYEES THAT DID CORING AND BONDING WERE PREVIOUS HOLDERS OF D.8. EXAMINATION OF PLUGS REVEALED NO ANOMALIES. THE COLUMN HEIGHT WAS CORRECT AND STRAIGHT. NO DAMAGE OR DEFORMATIES OF PLUGS WERE NOTED.

PA JERRY CAMPBELL 1/26/96

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER	ITEM	PAGE
N,0,1,5,8,1,2	2	3

BLOCK #42 CONT'D

ATTACH A COPY OF ALL PLUG PULL RESULTS AND RESUBMIT NCD TO ENGINEERING FOR EVALUATION AND FURTHER DISPOSITION.

MRB/ENG. LIAISON: T. Hayes 1/29/96
PAE/MRB: [signature] 1/29/96

Block #42 Cont'd
PER ENG DISPOSITION A Copy of Plug Pull RESULTS HAS BEEN ATTACHED TO THIS NCD Item #2, SEE Attachment Number 1

P.A. [signature] 1-29-96

BLOCK #42 CONT'D

BASED ON CONFORMING PLUG PULL RESULTS THIS MATERIAL APPLICATION IS ACCEPTABLE TO ENGINEERING, NO HARDWARE DEFECT.

MRB/ENG. LIAISON: T. Hayes 1/29/96
PAE/MRB: [signature] 1/29/96
NASA/MRB H.O. Hays 29 JAN 96

Contract - [signature] 1/31/96
96/OD/0071

MAE/MMA 37-028 (12/93)

LWT: 82

Thermal Protection Systems Test Report

TSS NO. 96HB504 (1)	DATE 1-25-96 (2)		
PRIORITY (3)	P.O. NO. (4)		
DESCRIPTION/PART NO./VENDOR (5) L/N 377600 8097.118413-021092 S/N 00000377600 Step 0030 Lead IN		LOT NO. (15)	TEST RESULTS (27)
		COMP A (16)	Does meet / Does not meet
		COMP B (17)	CHEMICAL
		MFG DATE (18)	MECHANICAL ✓
			INFORMATION ONLY
FROM Pos 3 Sta 2 - 8681 (6)	SPEC NO. 1535 (7)	SAMPLE MACHINED BY N/A	DIGITAL BALANCE NO. N/A (28)
QUANTITY RECD (8)	NO. SAMPLES SENT TO LAB (9)	SAMPLE BONDED BY	CAL DUE
SUBMITTED BY M. Howard (10)	EXT. 2-0605 (11) STAMP MSS 133 (12)	BUTTON BONDED BY 81142 1-24-96	PORTA-PULL TEST NO. ST00245 7/24/96
RAP DATE 1-25-96 (13)		BOND TENSION TEST BY R82688	CAL DUE 3-26-96
REMARKS (14) Plug Pull on tank 24 Hr. cure 12/22/95 1510 H-5.		REMARKS MEETS P.T. 1535 REQM. 1-25-96 MSS 133 1-25-96	APPROVED (30)

MIXED COMPONENTS TEST (19)	RESULTS	RQMTS
CREAM TIME		
DENSITY (FREE FOAM)		
GEL TIME		
HARDNESS		
POT LIFE		
TASE LIFE		
TACK FREE		
WT/GAL		

CHEMICAL TESTS	RESULTS (20) COMP A	RESULTS COMP B	REQUIREMENTS (2 COMP A	REQUIREMENTS COMP B
AMINE EQ				
FREON CONTENT				
HYDROXYL NO.				
PHOSPHORUS CONTENT				
REFRACTIVE INDEX				
SPECIFIC GRAVITY				
VISCOSITY				
WATER CONTENT				
ACID NO.				

MECHANICAL TEST

DENSITY (SPRAYED) AND/OR COMPRESSIVE STRENGTH (22)

SPECIMEN	LENGTH	WIDTH	AREA	THICK	VOLUME	WEIGHT	LOAD	DENSITY	PSI	REQD	HARDNES

TENSILE OR LAP SHEAR STRENGTH AND/OR ELONGATION (23) FAILURE MODE (24)

SPECIMEN	AREA	LOAD	PSI	ELONGATION	REQD	%ADH	%COH	%K/L	NO. OF K/L
L/I	1"		30.1		30 PSI		100		

TEST COMMENTS (25)

NCD # ND15812
Item # Two
Attachment # 1
Page 2 of 2

MSS 133 1-25-96

(26)
LAB TEST ENGINEER

NCSD NONCONFORMANCE SUPPLEMENTAL DATA

NCD NUMBER 1	ITEM 2	PAGE
N01,58,1,2	2	4

BLOCK 42 CONT'D.

QUALITY SUPERVISION CONCURS WITH "NO HARDWARE DEFECT".

PA JERRY CAMPBELL 2/1/96

BLOCK 5 CONT'D.

CHANGE TO READ: "0"

PA JERRY CAMPBELL 2/1/96

BLOCK #42 Cont'd

All Work Dispositioned Per This NCD Item Number Two is Complete and Acceptable. With-Held TA. Has Been Removed And Destroyed

P.A. [illegible] 3-5-96

NT 82

Thermal Protection Systems Test Report

JOB NO. 96 HB 506 (1)	DATE 1-25-96 (2)		
PRIORITY (3)	P.O. NO. (4)		
DESCRIPTION/PART NO./VENDOR (5)		LOT NO. (15)	TEST RESULTS (2
L/N 377600 8097111841 3-0290P 2		COMP A (16)	Does meet / Does not meet
S/N 0000037760 0		COMP B (17)	CHEMICAL
Step 35		MFG DATE (18)	MECHANICAL
			INFORMATION ONLY
FROM Pos 3 Sta 2 3681 (6)	SPEC NO. 1535 (7)	SAMPLE MACHINED BY N/A	DIGITAL BALANCE NO. N/A (2
QUANTITY RECD (8)	NO. SAMPLES SENT TO LAB 5 (9)	SAMPLE BONDED BY	CAL DUE
SUBMITTED BY M. Howard (10)	EXT. 2-0605 (11) STAMP MSS 133 (12)	BUTTON BONDED BY 181143 1-24-96	PORTA-PULL TEST NO. 5700245
RAP DATE 1-25-96 (13)		BOND TENSION TEST BY R826881 1-25-96	CAL DUE 3-26-

REMARKS (14)
Pluy Pulls on tank
24 Hr. cure 12/22/95 1510 Hrs.

REMARKS (2
MEETS P.T. 1535 REQM.
MSS 133 1-25-96
1-25-96
APPROVED (30)

MIXED COMPONENTS TEST (19)

	RESULTS	RQMTS
CREAM TIME		
DENSITY (FREE FOAM)		
GEL TIME		
HARDNESS		
POT LIFE		
GE LIFE		
CK FREE		
WT/GAL		

CHEMICAL TESTS	RESULTS (20) COMP A	RESULTS COMP B	REQUIREMENTS (2 COMP A	REQUIREMENTS COMP B
AMINE EQ				
FREON CONTENT				
HYDROXYL NO.				
PHOSPHORUS CONTENT				
REFRACTIVE INDEX				
SPECIFIC GRAVITY				
VISCOSITY				
WATER CONTENT				
ACID NO.				

MECHANICAL TEST

DENSITY (SPRAYED) AND/OR COMPRESSIVE STRENGTH (22)

SPECIMEN	LENGTH	WIDTH	AREA	THICK	VOLUME	WEIGHT	LOAD	DENSITY	PSI	REQD	HARDNES

TENSILE OR LAP SHEAR STRENGTH AND/OR ELONGATION (23) FAILURE MODE (24)

SPECIMEN	AREA	LOAD	PSI	ELONGATION	REQD	%ADH	%COH	%K/L	NO. OF K/L
Sta 922	1"		43.2		30 PSI		100		
Feedline Opening	1"		44.2		30 PSI		100		
+Y Aft flange	1"		31.9		30 PSI		100		
-Y Aft flange	1"		39.6		30 PSI		100		
-Y Fwd flange	1"		34.9		30 PSI		100		

TEST COMMENTS (25)

NCD# N015812
Item # two
Attachment # 1
Page 1 of 2

MSS 133 1-25-96
(26)
LAB TEST ENGINEER

MAF/MMA 37-137 (11/94)

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1 PART NUMBER: RAM-3004-011

RECORD OF REVISIONS

NO.	DCN	AUTHORITY	DATE	ME/QE/PIE/QIE	DESCRIPTION OF CHANGE
NEW		PLN. CHG.	03/08/94	ROSEANN A. GRAY	INITIAL RELEASE IN EMD FORMAT, INCLUDES PHASE III AUDIT.
			03/21/94	(QAE) K. MADDOX	REVIEWED RAM.
			03/29/94	(QIE) D. LANDER	NO INPUT.
1		QAEPLNGCHG	09/30/94	(QAE) K. MADDOX	REVISED PRIMER CALLOUT ON STEP 020, ADDED (G) TO STEPS 0046 AND 0056. REF MER 1689/61.
			10/03/94	(QIE) D. LANDER	NO INPUT.

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW PART NUMBER: RAM-1518-014

MFG. ENGR: JOHN COLEMAN DATE: 04/05/94 PART NUMBER: RAM-1518-014
Q.C. ENGR: V. MORALES DATE: 05/16//94 PLNG. CHG. LEVEL: NEW

PART NAME: PDL POUR, PLUG PULL & SLA VENT

NOTES:

ATTACHMENTS:

NCD NO. N015812 ITEM NO. ONE

ATTACHMENT NO. 1-6 MPP NO. 8097118443-029

LIST NUMBER 377600

NOTE: THE SYMBOL (G) ANNOTATED BY ANY STEP IN THIS DOCUMENT REPRESENTS THE POSSIBILITY OF A GOVERNMENT MANDATORY INSPECTION POINT (GMIP).

STEP NUMBER	BUYOFF	DATA RECORDING
005	3-5-96 R82688 SHOP	
006	MSS 133 3-5-96 QCBC	
0010	3-5-96 R82688 SHOP	SIZE AND LOCATION Panel 5 Between Ribs 14 & 15 3.0x3.0x1.1 Panel 5 Between Ribs 15 & 16 3.0x3.0x
0011	MSS 133 3-5-96 QCBC	RECORD REV. LEVEL AV
0015	3-5-96 R82688 SHOP	

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0020	3-5-96 R82688 ------- SHOP	SIZE AND LOCATION Panel 5 Between Rib 14+15 3.0X3.0X1.0D Panel 5 Between Rib 15+16 3.0X3.0X1.0D
0021	MSS 133 3-5-96 QCBC	RECORD REV. LEVEL AV
0025	96500 N/A 3-5-96 SHOPNC	
0030	96500 N/A 3-5-96 SHOPNC	
0031	MSS 133 N/A 3-5-96 QCBC	
0035	3-5-96 R82688 SHOPNC	
0040	3-5-96 R82688 SHOPNC	
0045	3-5-96 R82688 SHOPNC	
0050	3-5-96 R82688 SHOPNC	

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0055	3-5-96 R82688 SHOP	RESIN LAB. NO 95G770 EXP. DATE 8-1-96 CATALYST LAB. NO. 95G770 EXP DATE 8-1-96
0060	3-5-96 R82688 SHOPNC	MIX #1 MIX RATIO RESIN 92 gr CATALYST 100 gr. MIX COMPLETE: DATE 3-5-96 TIME 0920 Hrs. EXPIRATION TIME 1020 Hrs. MIX #2 MIX RATIO RESIN ____ CATALYST ____ MIX COMPLETE: DATE ____ TIME ____ EXPIRATION TIME ____ 3-5-96 R82688 MIX #3 MIX RATIO RESIN ____ CATALYST ____ MIX COMPLETE: DATE ____ TIME ____ EXPIRATION TIME ____ N A HUMIDITY READING IN MIX ENVIRONMENT 42 % TEMPERATURE IN MIX ENVIRONMENT 72°
0065	3-5-96 R82688 SHOP	
0070	3-5-96 R82688 SHOP	RECORD THE FOLLOWING: MIX 1 ADH. APPLICATION COMPLETE DATE 3-5-96 ADH. APPLICATION COMPLETE TIME 0935 Hrs. MIX 2 ADH. APPLICATION COMPLETE DATE 3-5-96 ADH. APPLICATION COMPLETE TIME R82688 MIX 3 ADH. APPLICATION COMPLETE DATE ____ ADH. APPLICATION COMPLETE TIME ____ N A
0075	3-5-96 R82688 SHOP	

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0080	3-5-96 R82688 SHOP	"A" LAB. NO. 95G767 EXP. DATE 4-1-96 "B" LAB. NO. 95G767 EXP. DATE 4-1-96
0085	3-5-96 R82688 SHOPNC	
0090	3-5-96 R82688 SHOP	
0091	MSS 133 3-5-96 QCBC	
0095	3-5-96 R82688 SHOP	RECORD DENSITY MIX TIME 1120 Hrs. DATE 2-29-96
0096	MSS 133 3-5-96 QCPC	
0100	96500 N/A 3-5-96 SHOP	
0105	96500 N/A 3-5-96 SHOPNC	
0106	MSS 133 N/A 3-5-96 QCPC	
0110	96500 N/A 3-5-96 SHOP	

	COMP. "A"	COMP. "B"
LAB NO.		
MATERIAL EXP. DATE		
10 DAY EXP. DATE		

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0115	3-5-96 R82688 SHOPNC	
0120	3-5-96 R82688 SHOPNC	RECORD: WORK AREA TEMP. 72° HUMIDITY 42% SUBSTRATE TEMP. 72°
0125	3-5-96 R82688 SHOP	
0130	3-5-96 R82688 SHOP	RECORD: DATE 3-5-96 RECORD TIME 1000 Hrs.
0135	3-5-96 R82688 SHOPNC	
0140	3-5-96 R82688 SHOP	
0145	3-5-96 R82688 SHOP	
0146	MSS 133 3-5-96 QCBC	
0150	3-5-96 R82688 SHOPNC	
0155	3-5-96 R82688 SHOPNC	RECORD: SUBSTRATE TEMP. 73° WORK AREA TEMP. 73° HUMIDITY 44%
0160	3-5-96 R82688 SHOP	RECORD: DATE 3-5-96 TIME 1220 Hrs.

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0165	R82688 3-5-96 SHOPNC	
0170	R82688 3-5-96 SHOPNC	
0175	R82688 3-5-96 SHOP	
0180	R82688 3-5-96 SHOP	
0181	MSS 133 3-5-96 QCPC	
0182	MSS 133 3-5-96 QCBC	
0183	MSS 133 3-5-96 QCBC	
0185	96500 N/A 3-5-96 SHOPNC	
0190	96500 N/A 3-5-96 SHOPNC	RECORD: WORK AREA TEMP._____ HUMIDITY_____ SUBSTRATE TEMP._____
0195	96500 N/A 3-5-96 SHOP	RECORED DATE_____ TIME_____
0200	96500 N/A 3-5-96 SHOPNC	

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0205	_____ SHOPNC	
0210	_____ SHOP	
0211	_____ QCBC	
0215	_____ SHOPNC	RECORD: WORK AREA TEMP._____ HUMIDITY_____ SUBSTRATE TEMP._____
0220	_____ SHOP	RECORD: DATE_____ RECORD TIME_____
0225	_____ SHOPNC	
0230	_____ SHOPNC	
0235	_____ SHOP	
0240	_____ SHOP	
0241	_____ QCPC	
0242	_____ QCBC	

N 96500 3-5-96

A

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0243	_____ QCBC	
0245	_____ SHOPNC	
0250	_____ SHOP	
0255	_____ SHOP	RECORD: SUBSTRATE TEMP._____ WORK AREA TEMP._____ RELATIVE HUMIDITY_____ TOOL INSTALLATION TIME COMPLETE_____
	SHOP	
0260	_____ SHOP	RECORD: DATE_____ TIME_____
0265	_____ SHOPNC	96500 3-5-96
0270	_____ SHOPNC	
0275	_____ SHOP	
0280	_____ SHOP	
0281	_____ QCPC	

N

A

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0282	_____ QCBC	
0283	_____ QCBC	
0285	_____ SHOPNC	
0290	_____ SHOPNC	RECORD: WORK AREA TEMP._____ HUMIDITY_____ SUBSTRATE TEMP._____
0295	_____ SHOP	3-5-96 96500
0300	_____ SHOP	RECORD: DATE_____ RECORD TIME_____
0305	_____ SHOPNC	
0310	_____ SHOP	
0315	_____ SHOP	
0316	_____ QCBC	
0320	_____ SHOPNC	

N

A

MANUFACTURING PROCESS PLAN (PHASE III FIRST BUILD)

PLNG. CHG. LEVEL: NEW

PART NUMBER: RAM-1518-014

PART NUMBER: RAM-1518-013

STEP NUMBER	BUYOFF	DATA RECORDING
0325	_____ SHOPNC	RECORD: SUBSTRATE TEMP._____ WORK AREA TEMP._____ RELATIVE HUMIDITY_____
0330	_____ SHOP	RECORD: DATE_____ TIME_____
0335	_____ SHOPNC	
0340	_____ SHOPNC	
0345	_____ SHOP	
0350	_____ SHOP	
0351	_____ QCPC	
0352	_____ QCBC	
0353	_____ QCBC	

N

3-5-96

96500

A

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: 1

PART NUMBER: RAM-4501-016

MFG. ENGR: GEORGE DATE: 09/19/94
Q.A. ENGR:F.GUTIERREZ DATE: 01/26/95

MPP TYPE: RAM
EFFECTIVITY: N/A

PART NAME: RAM-4501-016

ENGR. CHG. LEVEL: N/A
SERIALIZED ITEM: NO
SCID ITEM: NO
CONTROL POINT: (ALL)
SAFETY HAZARDS INVOLVED: NO

NOTES: THIS RAM IS FOR MARKING WITH PEN ON TPS OR QC ACCEPTANCE STAMPS ON TPS ONLY.

LEVEL 1 GRAPHICS REQUIRED: NO

SEQUENCE CRITICAL STEPS - NO

INDEX DATA

LIST OF SUPPORT DOCUMENTS
GENERAL NOTES/SAFETY WARNINGS/CAUTIONS
OPERATIONS SHEETS
RECORD OF REVISIONS

THIS REWORK ATTACHMENT CAN BE USED WITH A NON-CONFORMANCE DOCUMENT (NCD) AND/OR AN IN-PROCESS REWORK AUTHORIZATION SHEET (IPRAS). RECORD (AS APPLICABLE):

NCD/IPRAS NUMBER N015812 ITEM NUMBER ONE

ATTACHMENT NUMBER 1-7 MPP NUMBER 8097111843-029

ORDER NUMBER 377600

LIST OF SUPPORT DOCUMENTS

NOTES:

DOCUMENT NUMBER	REV. LEVEL	DESCRIPTION
P4501-14B	30SEP94	SURFACE PREPARATION
P4501-14H	11JUL94	MARKING FOAM SURFACES

MAJOR WAIVERS

MMC-ET-226

MMC-ET-229

Enclosure (1) to: 96MO-0421

DEVIATION APPROVAL REQUEST

1. FOR: [X] DEVIATION [ ] SUMMARY OF MINOR NONCONFORMANCES

2. FROM CONTRACTOR:	3. CONTRACT NUMBER:	4. REQUEST NUMBER:
Lockheed Martin	NAS8-36200	MMC-ET-226 (PCIN 082971)

5. NOMENCLATURE:	6. NUMBER:	7. REVISION:	8. DATE:
LH2 Tank Proof Test	80914002018		5/14/96

9. NONCONFORMANCE:	10. MRB ACTION NO:	11. SERIAL NUMBER(S):	12. LOT NUMBER:	13. QUANTITY:
[X] MINOR [ ] MAJOR	N/A	ET - 89	-----	1

14. SUPPLIER OR SUBCONTRACTOR (GIVE NAME AND ADDRESS):

LMMSS

15. SPECIFIED REQUIREMENTS:

The Space Shuttle ET Flight Acceptance Requirements, MMC-ET-TM04k-B, para. 2.3.1.2, specifies that for the LH2 Tank Structural Integrity Test there shall be no rupture when pressurized and loaded per DWG 80914002018. (See Page 2).

16. DESCRIPTION OF DEPARTURE FROM REQUIREMENTS:

The time the tank (ET-89) will be held at full proof pressure will exceed 45 minutes; the time to apply loads at full proof pressure will exceed 30 minutes and the cumulative time of this tank above 60% proof pressure may exceed 150 minutes requirement.

17. REASON FOR REQUEST AND/OR CORRECTIVE ACTION TAKEN:

Approval of this waiver will permit the usage of ET-89 LH2 Tank to be proof tested to verify facility operations.

18. REMARKS:

(See Page 2).

19. CONTRACTOR CERTIFICATION: THE CONTRACTOR HEREBY CERTIFIES THAT THE ABOVE DESCRIBED DEVIATION IS A DEPARTURE FROM THE CONTRACTOR REQUIREMENTS IN THE QUANTITIES AND/OR CONDITIONS AS STATED ABOVE.

[ ] _____ COST ADJUSTMENT (EXPLAIN)

[X] NO COST ADJUSTMENT

Director, Contracts (TITLE) — John A. Sommerby (SIGNATURE OF AUTHORIZED REPRESENTATIVE) — 5-17-96 (DATE)

20. GOVERNMENT QUALITY ASSURANCE REPRESENTATIVE COMMENTS:

Senior SoMA Rep. (TITLE) — CT Rush (SIGNATURE OF AUTHORIZED REPRESENTATIVE) — 5/17/96 (DATE)

21. MSFC REVIEW:

ORGANIZATION SYMBOL	REPRESENTATIVE	CONCURRENCE	NON-CONCURRENCE	DATE
ED27	Neil [illegible]	✓		5/21/96
EE31	Robert Crumbley	✓		5/21/96
CR70	M.D. Smith	✓		5/21/96

22. CONTRACTING OFFICER'S REPRESENTATIVE OR OTHER DULY DELEGATED AUTHORITY:

[ ] DISAPPROVAL (RECOMMENDED)

[X] APPROVAL (RECOMMENDED) (WITHOUT) PRICE ADJUSTMENT. $ _____

[illegible] (SIGNATURE) — 5/21/96 (DATE)

23. CONTRACTING OFFICER:

[X] APPROVED

[ ] DISAPPROVED

[ ] SUBJECT TO CONDITIONS STATED ON MSFC FORM _____-1.

Gary B. Woods (SIGNATURE) — 5-21-96 (DATE)

DEVIATION APPROVAL REQUEST
CONTINUATION SHEET

1. FROM (CONTRACTOR)	2. CONTRACT NO.	3. REQUEST NO.
Lockheed Martin	NAS8-36200	MMC-ET-226 (PCIN 082971)

BLOCK 15 (Continued)

Drawing 80914002018 specifies that full proof pressure testing shall not exceed 45 minutes and load case testing at 100% proof pressure shall not exceed 30 minutes. The cumulative time that any tank may be pressurized above 60% of full proof pressure shall not exceed 150 minutes.

BLOCK 18 (Continued)

Background

The first time ET 89 was proof tested there were timing violations caused by hydraulic system controls not able to ramp up the loads at 1% per second. Actual ramp rate was at 0.25% per second.

The re-proof integrity test for ET 89 will have the same ramp rate at 0.25% per second.

Add Notes follows:

Notes:

The proof test activity will be conducted in accordance with the requirements of engineering drawing 80914002018 with the exception of the deviations described herein.

The depressurization ramp rate will be in accordance with normal practice.

MARSHALL SPACE FLIGHT CENTER
CONFIGURATION CONTROL BOARD DIRECTIVE

1. CCBD NO: ET3-00-9312	2. CONFIGURATION CONTROL BOARD: EXTERNAL TANK - LEVEL III	3. DATE: 5-21-96
4. CHANGE NO: DAR MMC-ET-226		5. PAGE: 1 OF 1
6. PROGRAM CONTROL NO: 082971		7. RESPONSIBLE INDIVIDUAL/ORGANIZATION: M.A. Pessin/EE31
8. CHANGE TITLE: LH2 TANK PROOF TEST		9. DOCUMENTS AFFECTED (SPECs, ICDs, etc.): N/A
10. EFFECTIVITY: ET89		X HARDWARE X DOCUMENTATION

11. CHANGE DISPOSITION/ACTION(S):

This CCBD constitutes Technical Manager approval and Contracting Officer direction to implement DAR MMC-ET-226 as transmitted by Contractor's Letter 96MO-0421 dated May 17, 1996, as written.

12. CCB MEMBERS	CONCUR YES	CONCUR NO	CCB MEMBERS	CONCUR YES	CONCUR NO
M. Pessin/EE31					
J. Adams/SA34					
Smiles/CR70					
R. Woods/GP43					

13. CCB APPROVALS

G. R. Summer 5/21/96
ET Project Manager:

Jay B. Woods 5-21-96
Contracting Officer:

DEVIATION APPROVAL REQUEST

1. FOR: [X] DEVIATION [ ] SUMMARY OF MINOR NONCONFORMANCES

2. FROM CONTRACTOR: Lockheed Martin

3. CONTRACT NUMBER: NAS8-36200

4. REQUEST NUMBER: MMC-ET-229 (PCIN 082971)

5. NOMENCLATURE: LH2 Tank Proof Test

6. NUMBER: P/N 80914002018

7. REVISION:

8. DATE: 08/15/96

9. NONCONFORMANCE: [X] MINOR [ ] MAJOR

10. MRB ACTION NO: N/A

11. SERIAL NUMBER(S): ET-89

12. LOT NUMBER: -----

13. QUANTITY: 1

14. SUPPLIER OR SUBCONTRACTOR (GIVE NAME AND ADDRESS): LMMSS

15. SPECIFIED REQUIREMENTS:

The Space Shuttle ET Flight Acceptance Requirements, MMC-ET-TM04k-B, para. 2.3.1.2, specifies that for the LH2 Tank Structural Integrity Test there shall be no rupture when pressurized and loaded per DWG 80914002018.

16. DESCRIPTION OF DEPARTURE FROM REQUIREMENTS:

The time the tank (ET-89) will be held at full proof pressure will exceed 45 minutes; the time to apply loads at full proof pressure will exceed 30 minutes and the cumulative time of this tank above 60% proof pressure will exceed 150 minutes requirement.

17. REASON FOR REQUEST AND/OR CORRECTIVE ACTION TAKEN:

Approval of this waiver will permit the re-proof test of ET-89 LH2 Tank, at a reduced ramp rate of 0.25% per second, thereby exceeding the time constraint per drawing 80914002018.

18. REMARKS:

(See Page 2).

19. CONTRACTOR CERTIFICATION: THE CONTRACTOR HEREBY CERTIFIES THAT THE ABOVE DESCRIBED DEVIATION IS A DEPARTURE FROM THE CONTRACTOR REQUIREMENTS IN THE QUANTITIES AND/OR CONDITIONS AS STATED ABOVE.

[ ] _____ COST ADJUSTMENT (EXPLAIN)

[X] NO COST ADJUSTMENT

Director, Contracts (TITLE) — Signature of Authorized Representative — 8/15/96 (DATE)

20. GOVERNMENT QUALITY ASSURANCE REPRESENTATIVE COMMENTS:

NASA SOMA Sr. Rep. (TITLE) — C T Reinert (SIGNATURE OF AUTHORIZED REPRESENTATIVE) — 8/15/96 (DATE)

21. MSFC REVIEW:

ORGANIZATION SYMBOL	REPRESENTATIVE	CONCURRENCE	NON-CONCURRENCE	DATE
EE31	[illegible]	✓		8/16/96
CR70	M. D. [illegible]	✓		8/16/96

22. CONTRACTING OFFICER'S REPRESENTATIVE OR OTHER DULY DELEGATED AUTHORITY:

[ ] DISAPPROVAL (RECOMMENDED)

[X] APPROVAL (RECOMMENDED) (WITH) (WITHOUT) PRICE ADJUSTMENT: $ _____

Signature — 8/16/96 (DATE)

23. CONTRACTING OFFICER:

[X] APPROVED

[ ] DISAPPROVED

[ ] SUBJECT TO CONDITIONS STATED ON MSFC FORM _____-1.

Ray B. Woodson (SIGNATURE) — 8/16/96 (DATE)

MSFC - FORM 947 (REV. May 1969)

ORIGINAL

DEVIATION APPROVAL REQUEST
CONTINUATION SHEET

1. FROM (CONTRACTOR)	2. CONTRACT NO.	3. REQUEST NO.
Lockheed Martin	NAS8-36200	MMC-ET-229 (PCIN 082971)

BLOCK 15 (Continued)

Drawing 80914002018 specifies that full proof pressure testing shall not exceed 45 minutes and load case testing at 100% proof pressure shall not exceed 30 minutes. The cumulative time that any tank may be pressurized above 60% of full proof pressure shall not exceed 150 minutes.

BLOCK 18 (Continued)

Rationale of Test/Background:

The previous Proof Integrity Tests for ET-89 had timing violations caused by hydraulic system controls not able to ramp up in pressure at 1.0% per second. Actual ramp rate was at 0.25% per second.

The Re-proof Integrity Test for ET-89 will have a test ramp rate set at 0.25% per second rather than utilizing the 1.0% rate and test will be performed in manual mode in order to achieve the requirements of the engineering test plan and to allow hydraulic system to achieve test load criteria.

Reducing the ramp rate to 0.25% will result in exceeding the time constraint for proof test.

Notes:

The proof test activity will be conducted in accordance with the requirements of engineering drawing 80914002018 with the exception of the deviations described herein.

The depressurization ramp rate will be in accordance with normal practice.

MARSHALL SPACE FLIGHT CENTER

CONFIGURATION CONTROL BOARD DIRECTIVE

1. CCBD NO: ET3-00-9331	6. CONFIGURATION CONTROL BOARD: EXTERNAL TANK - LEVEL III	3. DATE: 8-16-96
4. CHANGE NO: DAR MMC-ET-229		5. PAGE: 1 OF 1
6. PROGRAM CONTROL NO: 082971		7. RESPONSIBLE INDIVIDUAL/ORGANIZATION: M. A. Pessin/EE31
8. CHANGE TITLE: PROOF TEST REQUIREMENTS FOR LH2 TANK		9. DOCUMENTS AFFECTED (SPECs, ICDs, etc.): N/A
10. EFFECTIVITY: ET89		_X_ HARDWARE _X_ DOCUMENTATION

8. CHANGE DISPOSITION/ACTIONS(S):

This CCBD constitutes Technical Manager approval and Contracting Officer direction to implement DAR MMC-ET-229 as transmitted by Contractor's Letter 96MO-0651 dated August 15, 1996, as written.

12. CCB MEMBERS	CONCUR YES	CONCUR NO	CCB MEMBERS	CONCUR YES	CONCUR NO	13. CCB APPROVALS
M. Pessin/EE31	MAP					ET Project Manager: 8/16/96
J. Adams/SA34						
M. Smiles/CR70	MAS					Contracting Officer: 8/16/96
R. Woods/GP43	—					
R. Crumbley/EE31	N/A					

SECTION IV

THIS SECTION CONTAINS THE FOLLOWING:

CERTIFICATE OF CONFIGURATION

SERIALIZATION LIST (LRU ONLY)

HARDWARE READINESS STATEMENT

CERTIFICATE OF CONFIGURATION

LOCKHEED MARTIN
MANNED SPACE SYSTEMS

CERTIFICATION OF CONFIGURATION

For the End Item Acceptance Data Package

June 27, 1997

This Certification of Configuration identifies completeness of the AS DESIGNED; AS PLANNED and AS BUILT configuration of this EXTERNAL TANK and its OFFSITE HARDWARE and verifies that all applicable changes have been incorporated, manufactured and accepted at the time of DD250.

Any Post DD250 Modification work will be separately authorized for this end item.

End Item Title: EXTERNAL TANK (ET-89/LWT-82)

EI Serial Number: 0000082

	ET AS-DELIVERED	ET OFFSITE INSTSALLATIONS
EI Part Number:	80901010000-109	80901019000-009
Revision Level:	FM	CG

Manned Space Systems
Configuration & Data Management
AS-DESIGNED & AS-PLANNED

Manned Space Systems
Product Assurance Configuration Systems
AS-BUILT

Note:
Upon Completion of Launch Site Installations, the As-Delivered External Tank becomes 80901000000-270 DCN DC

SERIALIZATION LIST

(LINE REPLACEABLE UNITS ONLY)

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
ME261-0045-0006	SEAL,FLANGE GFP	00040745810	80921011009-019	00000518680	
ME261-0045-0017	SEAL,FLANGE GFP	07407463103	80921011009-019	00000518680	LH2
ME261-0045-0017	SEAL,FLANGE GFP	71074074636	80921011009-019	00000518680	LO2
ME261-0045-0019	SEAL,FLANGE GFP	407-431-9	80921021009-030	00000518630	
ME261-0045-0023	SEAL,FLANGE GFP	402-1236-29	80921021009-030	00000518630	
PD4700187-079	VALVE VENT	00000000496	80921021039-180	00000457450	327A01 T41X1774E
PD4700189-029	VALVE, VENT & RELIEF, G	00000000219	80921021309-009	00000521020	303A01 T41X1724E T41X1727E
PD4800173-010	DISCONNECT	00000000294	80923021026-009	00000341660	
PD4800173-020	CAP PROTECTIVE	00000000112	80923021026-009	00000341660	
PD4800174-020	CAP PROTECTIVE	00000001877	80923021026-009	00000341660	
PD4800174-020	CAP PROTECTIVE	00000001878	80923021026-009	00000341660	
PD4800174-020	CAP PROTECTIVE	00000001879	80923021026-009	00000341660	
PD4800174-020	CAP PROTECTIVE	00000001880	80923021026-009	00000341660	
PD4800174-020	CAP PROTECTIVE	00000001881	80923021026-009	00000341660	
PD4800174-020	CAP PROTECTIVE	00000001882	80923021026-009	00000341660	
PD4800174-030	DISCONNECT	00000002331	80923021026-009	00000341660	
PD4800174-030	DISCONNECT	00000002333	80923021026-009	00000341660	
PD4800174-030	DISCONNECT	00000002334	80923021026-009	00000341660	
PD4800174-030	DISCONNECT	00000002335	80923021026-009	00000341660	
PD4800174-030	DISCONNECT	00000002336	80923021026-009	00000341660	
PD4800174-030	DISCONNECT	00000002337	80923021026-009	00000341660	
PD4800176-030	SCREEN OUTLET BX 18	00000001094	80922011900-009	00000376640	
PD4800176-030	SCREEN OUTLET BX 18	00000001095	80922011900-009	00000376640	

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
PD4800176-030	SCREEN OUTLET BX 18	00000001484	80922011900-009	00000376640	
PD4800176-030	SCREEN OUTLET BX 18	00000001485	80922011900-009	00000376640	
PD4800176-039	SCREEN SIPHON	00000001347	80924011901-009	00000480790	
PD4800176-039	SCREEN SIPHON	00000001348	80924011901-009	00000480790	
PD4800176-039	SCREEN SIPHON	00000001349	80924011901-009	00000480790	
PD4800176-039	SCREEN SIPHON	00000001350	80924011901-009	00000480790	
PD4800177-010	LINE ASSY	00000000142	80924901916-009	00000262690	
PD4800180-010	LINE ASSY	00000001161	80921021009-030	00000518630	LOC 1-6
PD4800180-019	LINE ASSY	00000001216	80921021009-030	00000518630	LOC 7-12
PD4800180-069	LINE ASSY	00000001282	80921021009-030	00000518630	OGIVE P.L
PD4800180-080	LINE ASSY	00000001341	80921021009-030	00000518630	P/L GO UMB JOINT H
PD4800180-089	LINE ASSY	00000001502	80921021009-030	00000518630	LOC 31-33 JOINTS G-H
PD4800180-089	LINE ASSY	00000001504	80921021009-030	00000518630	LOC 20-22 JOINTS D-E
PD4800180-089	LINE ASSY	00000001506	80921021009-030	00000518630	LOC 23-26 JOINTS E-F
PD4800180-089	LINE ASSY	00000001507	80921021009-030	00000518630	LOC 27-30 JOINTS F-G
PD4800180-090	LINE ASSY	00000001640	80921021009-030	00000518630	LOC 13-19
PD4800205-009	LINE ASSY	00000000479	80921021009-030	00000518630	
PD4800205-019	LINE ASSY	00000000599	80921021009-030	00000518630	LOC 23-26 JOINTS K-L
PD4800205-029	LINE ASSY	00000000698	80921021009-030	00000518630	P/L JOINT X - N
PD4800205-060	LINE ASSY	00000000899	80921021009-030	00000518630	P/L GH UMB JOINT Y
PD4800205-079	LINE ASSY	00000000530	80921021009-030	00000518630	LOC 20-22 JOINTS J-K
PD4800205-080	LINE ASSY	00000000658	80921021009-030	00000518630	LOC 27-29 JOINTS L-M
PD4800205-089	LINE ASSY	00000000779	80921021009-030	00000518630	P/L JOINT Y - X

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
32L10-2	HOSE	00000000210	80931043800-029	00000566410	327A04
32L10-2	HOSE	00000000211	80931043800-029	00000566410	327A05
32L2060133BA000	HOSE	00000000029	80921011930-010	00000521000	TITEFLEX
32L2060260AA000	HOSE	00000000078	80923011901-009	00000358770	
32L8-1	HOSE XH0045A	00000000985	80931043800-029	00000566410	303A02
32L8-1	HOSE XH0045A	00000000986	80931043800-029	00000566410	303A03
32L8-2	HOSE-XH0044A	00000001184	80931043800-029	00000566410	303A04
32L8-2	HOSE-XH0044A	00000001185	80931043800-029	00000566410	303A05
55L11-1S	SEAL	85904	80921021009-030	00000518630	JOINT H
55L11-1S	SEAL	85905	80921021009-030	00000518630	JOINT F
55L11-1S	SEAL	85906	80921021009-030	00000518630	FLANGE A
55L11-1S	SEAL	85907	80921021009-030	00000518630	JOINT F
55L11-1S	SEAL	85908	80921021009-030	00000518630	FLANGE B
55L11-1S	SEAL	85909	80921021009-030	00000518630	JOINT G
55L11-1S	SEAL	85910	80921021009-030	00000518630	JOINT D
55L11-1S	SEAL	85915	80921021009-030	00000518630	FLANGE C
55L11-5T	SEAL	83411	80921021009-030	00000518630	JOINT M
55L11-5T	SEAL	85741	80921021009-030	00000518630	JOINT L
55L11-5T	SEAL	85743	80921021009-030	00000518630	JOINT N
55L11-5T	SEAL	85751	80921021009-030	00000518630	JOINT Y
55L11-5T	SEAL	85752	80921021009-030	00000518630	DIFFUSER
55L11-5T	SEAL	85753	80921021009-030	00000518630	JOINT X
55L11-5T	SEAL	85949	80921021009-030	00000518630	JOINT K

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
55L4-18250	SEAL	HPF	80921011009-009	00000519050	L/C 2 -- S/N 45270 & 452660 8465-049&050
55L4-3460	SEAL	HSV	80934003719-019	00000424850	
55L4-3470	SEAL	HSW	80931003719-039	00000499710	14
55L4-5210	SEAL	HFL	80921011009-010	00000518680	10880
55L4-6350	SEAL	HSX	80921021309-009	00000521020	LOT 15 LINE/VALVE
55L4-8190	SEAL	HPG	80921021309-009	00000521020	LOT 3 LINE/DISC & VALVE/DOME
55L4-8190	SEAL	HPG	80931003810-029	00000521030	LOT 3
55L4-8190	SEAL	HPG	80921021039-180	00000457450	3
74L4-1	SENSOR,OXYGEN	00000001641	80932003709-029	00000346260	326A05 T41X1762E
74L4-1	SENSOR,OXYGEN	00000001659	80931003769-069	00000425950	326A06 T41X1766E
74L4-1	SENSOR,OXYGEN	00000001661	80931003769-069	00000425950	326A07 T41X1765E
74L4-1	SENSOR,OXYGEN	00000001662	80931003769-069	00000425950	326A08 T41X1767E
74L4-1	SENSOR,OXYGEN	00000001663	80931003769-069	00000425950	326A09 T41X1768E
74L4-1	SENSOR,OXYGEN	00000001664	80931003769-069	00000425950	326A10 T41X1769E
74L4-1	SENSOR,OXYGEN	00000001665	80931003769-069	00000425950	326A12 T41X1771E
74L4-1	SENSOR,OXYGEN	00000001666	80931003769-069	00000425950	326A11 T41X1770E
74L4-2	SENSOR,HYDROGEN	00000002240	80934003719-019	00000424850	302A05 T41X1712E
74L4-2	SENSOR,HYDROGEN	00000002241	80934003719-019	00000424850	302A14 T41X1730X
74L4-2	SENSOR,HYDROGEN	00000002242	80931003739-059	00000384490	302A06 T41X1716E
74L4-2	SENSOR,HYDROGEN	00000002243	80934003719-019	00000424850	302A15 T41X1731X
74L4-2	SENSOR,HYDROGEN	00000002244	80934003719-019	00000424850	302A16 T41X1732X
74L4-2	SENSOR,HYDROGEN	00000002245	80934003719-019	00000424850	302A17 T41X1733X
74L4-2	SENSOR,HYDROGEN	00000002246	80931003739-059	00000384490	302A07 T41X1715E

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80911071716-009	FTG ASSY LH2 LN SUPT	00000000259	80911071790-019	00000518640	
80911071716-010	FTG ASSY LH2 LN SUPT	00000000280	80911071790-019	00000518640	
80911071722-009	FITTING	00000000084	80911071790-019	00000518640	
80911071881-040	SUPPORT	00000000622	80971078480-159	00000336530	SUPPORT ASSEMBLY
80911071881-040	SUPPORT	00000000625	80911071880-340	00000357790	
80911071881-040	SUPPORT	00000000627	80911071880-340	00000357790	
80911071881-049	SUPPORT	00000000429	80911071880-340	00000357790	
80911141201-029	SUPPORT	00000000182	80911141200-029	00000401150	STA. 760.212
80911141201-030	SUPPORT	00000000226	80911141200-029	00000401150	STA. 828.056
80911141201-030	SUPPORT	00000000227	80911141200-029	00000401150	STA. 794.134
80912101001-009	FWD LEVEL PROBE SUP	00000288070	80912101000-030	00000306450	
80912101001-010	FWD LEVEL PROBE SUP	00000288070	80912101000-030	00000306450	
80912101001-019	FWD LEVEL PROBE SUP	00000288070	80912101000-030	00000306450	
80912101001-020	FWD LEVEL PROBE SUPP	00000288070	80912101000-030	00000306450	
80913010036-009	SUPPORT		80913010040-069	00000311270	
80913010038-009	ATTACH FITTING		80913010040-020	00000310030	
80914003972-010	FAIRING		80934003719-019	00000424850	
80914041405-039	FITTING	00000005809	80914041409-010	00000485750	STA. 1151
80914041405-039	FITTING	00000005811	80914041409-010	00000485750	STA. 1270
80914041405-039	FITTING	00000005812	80914041409-010	00000485750	STA. 1334
80914041405-039	FITTING	00000005813	80914041409-010	00000485750	STA. 1399
80914041405-039	FITTING	00000005814	80914041409-010	00000485750	STA. 1464
80914041405-039	FITTING	00000005815	80914041409-010	00000485750	STA. 1528

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80921011933-009	HELIUM INJ TUBE ASSY	00000467780	80921011941-060	00000484250	
80921011933-009	HELIUM INJ TUBE ASSY	00000467781	80921011941-060	00000484250	
80921011934-039	TUBE ASSY THERMAL	00000476250	80921011930-010	00000521000	
80921011935-010	FILTER	00000000168	80921011941-060	00000484250	
80921011935-010	FILTER	00000000169	80921011941-060	00000484250	
80921011939-009	MANIFOLD		80921011941-060	00000484250	
80921011942-001	HELIUM INJ MANIFOLD		80921011941-060	00000484250	
80921021026-030	TUBE ASSY	00000457410	80921021009-020	00000519060	
80921021026-040	TUBE ASSY	00000457420	80921021009-020	00000519060	
80921021026-049	TUBE ASSY	00000457430	80921021009-020	00000519060	
80921021027-030	TUBE	00000460310	80921021009-020	00000519060	
80921021027-040	TUBE ASSY	00000460320	80921021009-020	00000519060	
80921021027-049	TUBE ASSY	00000460330	80921021009-020	00000519060	
80921021027-050	TUBE ASSY	00000460340	80921021009-020	00000519060	
80921021027-059	TUBE ASSY	00000481720	80921021009-020	00000519060	
80921021030-009	DIFFUSER ASSY GO2	00000000078	80921021045-030	00000409760	
80921021032-099	SUPPORT ASSY	00000000718	80921021009-030	00000518630	
80921021032-100	SUPPORT ASSY	00000000738	80921021009-030	00000518630	
80921021032-109	SUPPORT ASSY	00000000758	80921021009-030	00000518630	
80921021032-110	SUPPORT ASSY	00000000778	80921021009-030	00000518630	
80921021032-119	SUPPORT ASSY	00000000797	80921021009-030	00000518630	
80921021032-120	SUPPORT ASSY	00000000818	80921021009-030	00000518630	
80921021034-009	HINGE SUPPORT ASSY	00000000246	80921021309-009	00000521020	

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80923021028-030	DUCT ASSY		80923021009-010	00000344450	
80923021032-009	TUBE ASSY	00000304510	80923021009-010	00000344450	
80923021032-010	TUBE ASSY	00000305400	80923021009-010	00000344450	
80923021032-019	TUBE ASSY	00000305410	80923021009-010	00000344450	
80923021032-020	TUBE ASSY	00000304520	80923021009-010	00000344450	
80923021032-029	TUBE ASSY	00000305420	80923021009-010	00000344450	
80923021032-030	TUBE ASSY	00000304530	80923021009-010	00000344450	
80923021032-039	TUBE ASSY	00000304540	80923021009-010	00000344450	
80923021032-040	TUBE ASSY	00000304550	80923021009-010	00000344450	
80923021033-009	TUBE ASSY	00000332540	80923021009-010	00000344450	
80923021033-010	TUBE ASSY	00000199460	80923021009-010	00000344450	
80923021033-019	TUBE ASSY	00000332000	80923021009-010	00000344450	
80923021033-019	TUBE ASSY	00000332001	80923021009-010	00000344450	
80923021034-009	TUBE ASSY	00000308970	80923021009-010	00000344450	
80923021034-010	TUBE ASSY	00000308390	80923021009-010	00000344450	
80923021034-019	TUBE ASSY	00000308400	80923021009-010	00000344450	
80923021035-009	TUBE ASSY	00000311760	80923021009-010	00000344450	
80923021035-010	TUBE ASSY	00000311770	80923021009-010	00000344450	
80923021035-019	TUBE ASSY	00000311780	80923021009-010	00000344450	
80923021036-049	TUBE ASSY	00000517680	80923021009-010	00000344450	
80923021036-050	TUBE ASSY	00000311800	80923021009-010	00000344450	
80923021036-059	TUBE ASSY	00000311810	80923021009-010	00000344450	
80923021037-010	TUBE ASSY	00000311820	80923021009-010	00000344450	

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80931003714-179	ELEC INTERCON DIAG	00000450290	80931003820-029	00000521050	303W07
80931003714-180	ELEC INTERCON DIAG	00000470580	80931003820-029	00000521050	303W08
80931003714-189	ELEC INTERCON DIAG	00000475180	80931003820-029	00000521050	303W09
80931003714-190	ELEC INTERCON DIAG	00000474200	80931003820-029	00000521050	303W10
80931003714-199	ELEC INTERCON DIAG	00000470590	80931003820-029	00000521050	303W11
80931003714-200	ELEC INTERCON DIAG	00000450300	80931003820-029	00000521050	303W12
80931003716-009	TUBING ASSY	00000410660	80931003729-109	00000457000	
80931003716-079	TUBE ASSY	00000410670	80931003729-109	00000457000	
80931003731-009	PRESSURE XDUCER-XH0233A	00000000093	80931003800-029	00000501640	327A02 T41P1750C
80931003731-009	PRESSURE XDUCER-XH0233A	00000000094	80931003800-029	00000501640	327A03 T41P1751C
80931003731-009	PRESSURE XDUCER-XH0233A	00000000095	80931003800-029	00000501640	327A04 T41P1752C
80931003769-069	ASSY LO2 MAST	00000425950	80931003719-039	00000499710	
80931023704-059	INTERCONNECTION	00000417150	80931023709-030	00000511580	
80931023704-060	INTERCONNECTION	00000417160	80931023709-030	00000511580	
80932003704-020	INTERCONNECTOR	00000337190	80932003709-029	00000346260	
80933003704-099	ELEC INTCON DIAG	00000311870	80933003719-070	00000342280	314W19
80933003704-110	ELEC INTCON DIAG	00000311880	80933003719-070	00000342280	314W22
80933003704-120	ELEC INTCON DIAG	00000316180	80933003719-070	00000342280	
80933003704-249	ELEC INTCON DIAG	00000329680	80933003719-070	00000342280	
80933003704-379	ELEC INTER DIAG 314W	00000316190	80933003719-070	00000342280	
80933003704-380	ELEC INTER DIAG 314W	00000318140	80933003719-070	00000342280	
80933003704-419	ELEC INTER DIAG 314W	00000317110	80933003719-070	00000342280	
80934003709-019	PLATE LO2, FEEDTHRO	00000448610	80931003719-039	00000499710	

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80971028415-150	COVER TPS APPL	00000456180	80911031849-030	00000521080	
80971028415-159	COVER SOFI APPL	00000463350	80911031849-030	00000521080	
80971028415-160	COVER SOFI APPL	00000482110	80911031849-030	00000521080	
80971028417-140	SEGMENT	00000469410	80911001200-010	00000518660	STA 371-404
80971028417-149	SEGMENT	00000460020	80911001200-010	00000518660	STA 404-439
80971028417-149	SEGMENT	00000460030	80911001200-010	00000518660	STA 439-476
80971028417-149	SEGMENT	00000460040	80911001200-010	00000518660	STA 476-514
80971028417-150	SEGMENT	00000460800	80911001200-010	00000518660	STA 634-676
80971028417-150	SEGMENT	00000460810	80911001200-010	00000518660	STA 676-718
80971028417-150	SEGMENT	00000460820	80911001200-010	00000518660	STA 593-634
80971028417-159	SEGMENT	00000461620	80911001200-010	00000518660	STA 553-593
80971028417-159	SEGMENT	00000461630	80911001200-010	00000518660	STA 514-553
80971028417-160	SEGMENT	00000457490	80911001200-010	00000518660	STA 718-760
80971028419-039	GAP COVER, TPS APPL	00000480560	80911031849-030	00000521080	
80971028419-040	GAP COVER ASSY	00000480570	80911031849-030	00000521080	
80971028419-110	COVER SOFI APPL	00000505070	80911031849-030	00000521080	
80971028419-120	COVER ASSY SOFI APPL	00000487610	80911031849-030	00000521080	
80971028421-010	COVER ASSY	00000484290	80911031849-030	00000521080	
80971028421-019	COVER ASSY	00000482120	80911031849-030	00000521080	
80971028421-029	COVER	00000480590	80911031849-030	00000521080	
80971028421-110	COVER ASSY SOFI APPL	00000484300	80911031849-030	00000521080	
80971028422-110	CABLE TRAY	00000491100	80911001419-020	00000520960	STA 1851
80971028422-110	CABLE TRAY	00000491110	80911001419-020	00000520960	STA 1916

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80971028448-030	FAIRING	00000423190	80911031864-049	00000501610	
80971028449-119	FAIRING SOFI APPL	00000475490	80911031888-039	00000521080	
80971028449-120	FAIRING SOFI APPL	00000466050	80911031888-040	00000521080	
80971028450-029	CABLE TRAY SUPP TPS	00000463320	80911031849-030	00000521080	
80971028450-049	FAIRING SUPPORT	00000474290	80911031849-030	00000521080	
80971028450-229	FAIRING RH SOFI APPL	00000473330	80911031849-030	00000521080	
80971028450-230	FAIRING RH SOFI APPL	00000463330	80911031849-030	00000521080	
80971028460-189	STRUT, SOFI APPL	00000477790	80911001459-009	00000518120	STA 1377
80971028460-189	STRUT, SOFI APPL	00000477800	80911001459-009	00000518120	STA 1623
80971028460-189	STRUT, SOFI APPL	00000477820	80911001459-009	00000518120	STA 1871
80971028460-189	STRUT, SOFI APPL	00000477830	80911001459-009	00000518120	STA 1973
80971028460-189	STRUT, SOFI APPL	00000477840	80911001459-009	00000518120	STA. 1129
80971028460-190	YOKE ASSY,SOFI	00000467340	80911001459-009	00000518120	STA 1973
80971028460-199	FITTING, SOFI APPL	00000490270	80911001459-009	00000518120	STA. 1129
80971028465-049	FDLN, SOFI APPL	00000454530	80921011009-009	00000519050	
80971028465-050	FDLN, SOFI APPL	00000453680	80921011009-009	00000519050	
80971028472-010	MANHOLE COVER, SOFI	00000480610	80911001204-009	00000520970	
80971028475-060	COVER, SLA APPL	00000487550	80911031849-030	00000521080	
80971028480-049	GUIDE ASSY	00000475460	80921021009-030	00000518630	GUIDE ASSYU
80971028480-050	GUIDE	00000475470	80921021009-030	00000518630	GUIDE ASSY
80971028480-059	GUIDE ASSY	00000475480	80921021009-030	00000518630	GUIDE ASSY
80971028488-070	MOUNT SLIDE TPS	00000450460	80971028488-130	00000467830	MOUNT, SLIDE SINGLE
80971028488-070	MOUNT SLIDE TPS	00000450470	80921021009-030	00000518630	LOC 2

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80971028488-079	MOUNT SLIDE TPS	00000463640	80921021009-030	00000518630	LOC 30
80971028488-079	MOUNT SLIDE TPS	00000463650	80921021009-030	00000518630	LOC 29
80971028488-079	MOUNT SLIDE TPS	00000463660	80921021009-030	00000518630	LOC 21
80971028488-079	MOUNT SLIDE TPS	00000463670	80921021009-030	00000518630	LOC 20
80971028488-079	MOUNT SLIDE TPS	00000463680	80921021009-030	00000518630	LOC 25
80971028488-079	MOUNT SLIDE TPS	00000463690	80921021009-030	00000518630	LOC 31
80971028488-079	MOUNT SLIDE TPS	00000463700	80921021009-030	00000518630	LOC 28
80971028488-079	MOUNT SLIDE TPS	00000463710	80921021009-030	00000518630	LOC 22
80971028488-079	MOUNT SLIDE TPS	00000463720	80921021009-030	00000518630	LOC 23
80971028488-079	MOUNT SLIDE TPS	00000478470	80921021009-030	00000518630	LOC 33
80971028488-080	MOUNT SLIDE TPS	00000462700	80921021009-030	00000518630	LOC 23
80971028488-080	MOUNT SLIDE TPS	00000462710	80921021009-030	00000518630	LOC 24
80971028488-080	MOUNT SLIDE TPS	00000462720	80921021009-030	00000518630	LOC 32
80971028488-080	MOUNT SLIDE TPS	00000462730	80921021009-030	00000518630	LOC 25
80971028488-080	MOUNT SLIDE TPS	00000462740	80921021009-030	00000518630	LOC 31
80971028488-080	MOUNT SLIDE TPS	00000462750	80921021009-030	00000518630	LOC 30
80971028488-080	MOUNT SLIDE TPS	00000462760	80921021009-030	00000518630	LOC 28
80971028488-080	MOUNT SLIDE TPS	00000462770	80921021009-030	00000518630	LOC 22
80971028488-080	MOUNT SLIDE TPS	00000462780	80921021009-030	00000518630	LOC 26
80971028488-080	MOUNT SLIDE TPS	00000462790	80921021009-030	00000518630	LOC 21
80971028488-080	MOUNT SLIDE TPS	00000462800	80921021009-030	00000518630	LOC 33
80971028488-080	MOUNT SLIDE TPS	00000462810	80921021009-030	00000518630	LOC 20
80971028488-080	MOUNT SLIDE TPS	00000462820	80921021009-030	00000518630	LOC 31

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80971048425-119	C/T COVER ASSY TPS	00000477410	80911041429-019	00000565550	1528-1593
80971048425-119	C/T COVER ASSY TPS	00000477420	80911041429-019	00000565550	1464-1528
80971048425-119	C/T COVER ASSY TPS	00000502130	80911041429-019	00000565550	STA 1205-1270
80971048425-119	C/T COVER ASSY TPS	00000502140	80911041429-019	00000565550	STA 1593-1657
80971048425-119	C/T COVER ASSY TPS	00000502150	80911041429-019	00000565550	STA 1787-1851
80971048425-119	C/T COVER ASSY TPS	00000502160	80911041429-019	00000565550	STA 1399-1464
80971048425-120	C/T COVER ASSY TPS	00000482140	80911041429-019	00000565550	1851-1916
80971048425-120	C/T COVER ASSY TPS	00000482150	80911041429-019	00000565550	1916-1980
80971048425-129	C/T COVER ASSY TPS	00000487320	80911041429-019	00000565550	STA 1980-2028
80971048431-009	FAIRING ASSY	00000487720	80911041429-019	00000565550	FAIRING
80971048446-010	COVER ASSY	00000486630	80911041149-059	00000566370	
80971048448-010	COVER INSTL	00000491350	80911041149-069	00000566090	
80971048490-080	GAP CLOSURE	00000475520	80911041429-019	00000565550	STA 1787
80971048490-080	GAP CLOSURE	00000477650	80911041429-019	00000565550	STA 1851
80971048490-119	GAP CLOSURE	00000486640	80911041205-009	00000566390	STA 553
80971048490-119	GAP CLOSURE	00000486650	80911041205-009	00000566390	STA 439
80971048490-119	GAP CLOSURE	00000486660	80911041205-009	00000566390	STA 476
80971048490-119	GAP CLOSURE	00000495850	80911041205-009	00000566390	STA 514
80971048490-119	GAP CLOSURE	00000495860	80911041205-009	00000566390	STA 593
80971048490-130	GAP CLOSURE	00000487330	80911041429-019	00000565550	1151
80971048490-130	GAP CLOSURE	00000487340	80911041429-019	00000565550	1916
80971048490-130	GAP CLOSURE	00000487350	80911041429-019	00000565550	1528
80971048490-130	GAP CLOSURE	00000487360	80911041429-019	00000565550	1334

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
80971078442-070	SUPPT ASSY, SLA	00000398060	80911071809-200	00000441220	
80971078442-110	CABLE TRAY ASSY	00000397370	80911071809-200	00000441220	
80971078442-129	CABLE TRAY, SOFI APPL	00000410310	80911071809-200	00000441220	
80971078445-109	CABLE TRAY ASSY TPS	00000447670	80911071809-180	00000518650	
80971078445-110	CABLE TRAY ASSY TPS	00000448640	80911071809-180	00000518650	
80971078452-010	C/TRAY SUPP TPS APPL	00000450500	80911071809-180	00000518650	
80971078475-030	FAIRING	00000445940	80911071809-060	00000466640	
80971078475-049	FAIRING,LH2 TPS APPL	00000447610	80911071809-180	00000518650	
80971078476-020	FAIRING UMBILICL TPS	00000446920	80911071809-099	00000518650	
80971078477-280	CABLE TRAY TPS APPL	00000477850	80911071809-180	00000518650	
80971078477-309	CABLE TRAY, SOFI APPL	00000482770	80911071809-180	00000518650	
80971078478-029	SUPPORT TPS	00000447690	80911071809-169	00000466620	
80971078478-039	SUPPORT TPS	00000447500	80911071809-060	00000466640	
80971078478-149	SPRT FTG, TPS APPL	00000449730	80911071809-179	00000466630	
80971078478-159	SUPPORT TPS	00000447520	80911071809-060	00000466640	
80971078478-180	SUPPORT FTG	00000450980	80911071809-179	00000466630	
80971078480-159	TPS APPL	00000336530	80911071880-340	00000357790	
80971078498-029	HELIUM INJ BOX	00000459510	80921011941-060	00000484250	
80971128418-030	FAIRING	00000357440	80911141200-029	00000401150	
80972028414-010	SUPPT ASSY TPS APPL	00000382330	80912041000-019	00000401150	STA. 718.040
80972028414-010	SUPPT ASSY TPS APPL	00000382340	80912041000-019	00000401150	STA. 676.080
80972028414-010	SUPPT ASSY TPS APPL	00000382350	80912041000-019	00000401150	STA. 634.510
80972028414-010	SUPPT ASSY TPS APPL	00000382360	80912041000-019	00000401150	STA. 593.540

HARDWARE READINESS STATEMENT

HARDWARE PRE-SHIPMENT REVIEW
READINESS STATEMENT
EXTERNAL TANK PROJECT

ELEMENT	SERIAL NUMBER
External Tank ET-89	0000082

PRE-SHIPMENT READINESS STATEMENT: Supersedes Statement signed at DD250.	EXCEPTIONS	
This statement certifies satisfactory acceptance checkout completion, configuration inspection baseline, execution of formal DD 1149/DD 250 and readiness for delivery to the using site. The contractor/NASA certification is limited to the contractual/organizational obligation.	CONTRACTOR	NASA
REQUIREMENT CODES:		
a) An acceptance review or equivalent has been satisfactorily completed and a DD 250 or DD 1149 executed at the point of first acceptance.	None	None
b) Each departure from specifications and drawings has been approved by the Material Review Board or by contractual waiver.	None	None
c) Acceptance checkout has been successfully completed in accordance with the specified Requirements Documents.	None	None
d) All acceptance checkout discrepancies have been resolved, and associated retesting completed.	None	None
e) All failures of hardware have been resolved and corrective action implemented or approved.	None	None
f) A Configuration Inspection (CI) has been satisfactorily completed.	None	None
g) All unplanned/deferred work is defined in the Acceptance Data Package, and is accepted for transfer to the using site, and any impacts to processing have been identified.	None	None
h) All residual hazards have been identified and approved by NASA.	None	None
i) Functional GFE has been installed and accepted.	None	None
j) There are no open key issues affecting this element (or segment thereof).	None	None
k) This element (or segment thereof) is ready for transfer to the using site.	None	None

This External Tank is hereby certified and ready for Shipment to the Launch Site contingent upon any exceptions noted herein.

Date: 7/7/97
Terry L. Hibbard
Vice President, ET Project
Lockheed Martin Manned Space Systems

Date: 7/7/97
Parker V. Counts
Manager, ET Project
NASA/MSFC

Date:
Robert B. Sieck
Director, Space Shuttle Operations
NASA.KSC

HARDWARE ACCEPTANCE REVIEW
READINESS STATEMENT
EXTERNAL TANK PROJECT

ELEMENT	SERIAL NUMBER
External Tank ET-89	0000082

DD250/DD1149 HARDWARE ACCEPTANCE READINESS STATEMENT:	EXCEPTIONS	
This readiness statement certifies satisfactory acceptance checkout completion; configuration inspection baseline; execution of formal DD250/DD1149 and readiness for delivery to the using site.	CONTRACTOR	NASA
REQUIREMENT CODES:		
a) Each departure from specifications and drawings has been approved by the Material Review Board or by contractual waiver.	None	None
b) Acceptance checkout has been successfully completed in accordance with the specified Requirements Documents.	None	None
c) All acceptance checkout discrepancies have been resolved, and associated retesting completed.	None	None
d) All failures of hardware have been resolved and corrective action implemented or approved.	None	None
e) A Configuration Inspection (CI) has been satisfactorily completed.	None	None
f All unplanned/deferred work is defined in the Acceptance Data Package, and is accepted for transfer to the using site, and any impacts to processing have been identified.	None	None
g) All residual hazards have been identified and approved by NASA.	None	None
h) Functional GFE has been installed and accepted.	None	None
i) There are no open key issues affecting this element (or segment thereof).	None	None

This External Tank is hereby certified and ready for DD250 Delivery and Shipment to the Launch Site contingent upon any exceptions noted herein.

Terry L. Hibbard Date: 6/26/97
Terry L. Hibbard
Vice President, ET Project
Lockheed Martin Manned Space Systems

for Parker V. Counts Date: 6/26/97
Parker V. Counts
Manager, ET Project
NASA/MSFC

SECTION V

This Section contains the following:

Calibration Data Log sheets that identifies the following:

PART NUMBER
PART NAME
SERIAL NUMBER/LOT NUMBER
INSTALLATION DRAWING
REFERENCE DESIGNATOR
MEASUREMENT IDENTIFICATION
NON-STANDARD CALIBRATION CURVE IDENTITY
(Annotated by a double asterisk)
CALIBRATION CURVES/VENDOR DATA FOR SENSORS

Liquid Level Sensor Requirements

INFORMATION:
Other pertinent data, such as excitation voltage, range, stimulus, etc., are contained in the application procurement design drawing of which KSC is on current distribution.

KSC are also on distribution for Calibration Tapes. The Calibration Tapes and PD drawings are not included as a part of the ADP.

CALIBRATION DATA LOG

CALIBRATION ITEMS LWT - 00082

PART NUMBER	PART DESCRIPTION	PART SERIAL	INSTALLATION ASSEMBLY NO.	SERIAL NUMBER	REFERENCE/STATION DESIGNATOR/LOCATION
PD4700187-079	VALVE VENT	00000000496	80921021039-180	00000457450	327A01 T41X1774E
PD4700189-029	VALVE, VENT & RELIEF, G	00000000219	80921021309-009	00000521020	303A01 T41X1724E T41X1727E
PD7400098-089	TRANSDUCER XH0064A	00000001726	80931003810-029	00000521030	303A02 T41P1700C
PD7400098-089	TRANSDUCER XH0064A	00000001727	80931003810-029	00000521030	303A03 T41P1701C
PD7400098-089	TRANSDUCER XH0064A	00000001728	80931003810-029	00000521030	303A04 T41P1702C
PD7400098-089	TRANSDUCER XH0064A	00000001729	80931003810-029	00000521030	303A05 T41P1703C
PD7400106-079	TRANSDUCER	00000001242	80931003729-109	00000457000	327A47 T41P1740H
PD7400106-079	TRANSDUCER	00000001260	80931003729-109	00000457000	327A8 T41T1741H
PD7400244-009	TRANSDUCER	00000000028	80931003739-059	00000384490	302A13 T41T1705A
PD7400244-019	TRANSDUCER	00000000090	80931003769-069	00000425950	326A13 T41T1775A
PD7400244-029	TRANSDUCER	00000000230	80933003719-070	00000342280	314A31 T41T1810H
PD7400244-029	TRANSDUCER	00000000231	80933003719-070	00000342280	314A32 T41T1811H
PD7400244-029	TRANSDUCER	00000000256	80931003800-029	00000501640	327A09 T41T1820H
PD7400244-029	TRANSDUCER	00000000257	80931003800-029	00000501640	327A10 T41T1821H
10345-1D	DUMMY XDUCER LO2	00000000023	80931003800-029	00000501640	327A05 T41P1753C
74L4-1	SENSOR,OXYGEN	00000001641	80932003709-029	00000346260	326A05 T41X1762E
74L4-1	SENSOR,OXYGEN	00000001659	80931003769-069	00000425950	326A06 T41X1766E
74L4-1	SENSOR,OXYGEN	00000001661	80931003769-069	00000425950	326A07 T41X1765E
74L4-1	SENSOR,OXYGEN	00000001662	80931003769-069	00000425950	326A08 T41X1767E
74L4-1	SENSOR,OXYGEN	00000001663	80931003769-069	00000425950	326A09 T41X1768E
74L4-1	SENSOR,OXYGEN	00000001664	80931003769-069	00000425950	326A10 T41X1769E
74L4-1	SENSOR,OXYGEN	00000001665	80931003769-069	00000425950	326A12 T41X1771E
74L4-1	SENSOR,OXYGEN	00000001666	80931003769-069	00000425950	326A11 T41X1770E

CALIBRATION CURVES (VENDOR DATA)

(UNDER SEPARATE COVER)

LIQUID LEVEL SENSOR REQUIREMENTS

ET-89/LWT-82 LIQUID LEVEL SENSOR TEST DATA EVALUATION - TEST and TOOLING OPERATIONS

ET89/LWT82_[7/10/95]:

HARNESS RESISTANCE EVALUATION

NOMEN	CONN/PIN	REF DESIG	ICD/TM04 REQ MIN	ICD/TM04 REQ MAX	EXPECTED RES *(g)	CALCULATED CABLE RESISTANCE IN OHMS (Ω) 7C07-FA	420 / 6C	420 / 6D	6D101-MC	KSC
LH2 LEV #1	J33-A,B	302A14	0.1	6.5	2.2	1.4	1.5	1.6	N/A	N/A
LH2 LEV #2	J33-P,R	302A15	0.1	6.5	2.0	1.4	1.5	1.6	N/A	N/A
LH2 LEV #3	J23-A,B	302A16	0.1	6.5	2.5	1.9	2.0	2.1	N/A	N/A
LH2 LEV #4	J23-P,R	302A17	0.1	6.5	2.6	1.8	1.9	2.0	N/A	N/A
LH2 5%	J23-H,c	302A05	0.1	6.5	2.2	1.3	1.4	1.4	N/A	N/A
LH2 98%#1	J33-u,DD	302A07	0.1	6.5	4.7	3.5	3.5	3.5	N/A	N/A
LH2 98%#2	J23-q,CC	302A06	0.1	6.5	5.1	4.7	4.7	4.7	N/A	N/A
LH2 100%(-)	J33-J,d	302A11	0.1	6.5	4.5	4.2	4.3	4.3	N/A	N/A
LH2 100%#1	J23-p,BB	302A09	0.1	6.5	5.0	4.0	4.1	4.2	N/A	N/A
LH2 100%#2	J33-EE,HH	302A08	0.1	6.5	4.4	3.7	3.8	3.8	N/A	N/A
LH2 100%(+)	J23-e,v	302A10	0.1	6.5	5.0	4.1	4.2	4.2	N/A	N/A
LH2 OF	J33-T,n	302A12	0.1	6.5	4.5	3.6	3.7	3.8	N/A	N/A
LO2 5%	J33-H,c	326A05	0.6	9.5	4.3	3.5	3.6	3.6	N/A	N/A
LO2 98%#1	J23-u,DD	326A07	0.6	9.5	6.2	5.7	5.8	5.8	N/A	N/A
LO2 98%#2	J33-q,CC	326A06	0.6	9.5	5.6	5.4	5.5	5.5	N/A	N/A
LO2 100%(-)	J23-J,d	326A08	0.6	9.5	6.2	5.2	5.3	5.3	N/A	N/A
LO2 100%#1	J33-p,BB	326A09	0.6	9.5	5.8	4.7	4.8	4.8	N/A	N/A
LO2 100%#2	J23-EE,HH	326A10	0.6	9.5	6.3	5.4	5.5	5.6	N/A	N/A
LO2 100%(+)	J33-e,v	326A11	0.6	9.5	5.8	5.2	5.3	5.3	N/A	N/A
LO2 OF	J23-T,n	326A12	0.6	9.5	6.2	4.3	4.4	4.4	N/A	N/A

ET HARNESS RESISTANCE VALUE ACCEPTANCE

TOLERANCE = 0.5

NOMEN	BUY	√	BUY	√	BUY	√	BUY	√	BUY	√
	7C07-FA		420 / 6C		420 / 6D		6D101-MC		KSC	
LH2 LEV #1	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 LEV #2	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 LEV #3	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 LEV #4	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 5%	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 98%#1	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 98%#2	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 100%(-)	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 100%#1	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 100%#2	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 100%(+)	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LH2 OF	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LO2 5%	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LO2 98%#1	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LO2 98%#2	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LO2 100%(-)	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LO2 100%#1	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LO2 100%#2	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LO2 100%(+)	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A
LO2 OF	OK	Sure	OK	Sure	OK	Sure	N/A	N/A	N/A	N/A

GENERAL NOTES:

a) Data points enclosed by: [ ] are uncertain, questionable, or were missing (see specific notes below).

b) Data points that appear in **Boldface** are nominal values inserted for analysis purposes.

c) This data uses 74L4 sensor equation to calculate liquid level sensor values.

d) The 68° calculated value for level sensors is derived from in-house test data.

e) In-house measured values of temperatures for reference only. Equations use Ullage temp sensor calculated temperature where available.

f) Above harness calculations use nominal actual alpha (.00396) for liquid level sensors and vendor calculated Ullage temperature sensor alpha.

g) Expected cable resistance is average for LWT42,43,44,45,46 plus internal calc. value for forward masts. Values for low level sensor values are calculated values.

h) Used calculated temperature of RT.

i) TP-7C07-FA {ET-69 & UP}, TP-6C105-AT Part 7 {ET-71 & Up} & TP-6D105-AT Part 4 {ET-71 & Up} were "4-Wire" tests.

STANDARD NOTES:

1) Data not collected for this tank.

2) Used nominal room temperature of 68°F (No temperature compensation)

3) Used temp values from previous test.

4) Used data values from previous test.

UNIQUE NOTES:

5) LH2 Fwd mast reworked & retested per NCD-N018083 [TP-7J01-FT, TP-6C148-HA, TP-6C149-HA]. Originally planned for LWT-80.

6) Inverted vendor data. Post-clean values were higher than pre-clean. Apparant error in entering data into correct data sheet blanks at vendor.

* Satisfies MMC-ET-TM04k-B Para. 2.5.1.A per TP-6D105-AT

SYSTEMS ENGINEERING	CARLOS B. COOPER	6/19/97
TEST & TOOLING OPERATIONS	SCOT H. MARSHALL	06/19/97
QUALITY ASSURANCE ENGINEERING	KEITH C. TASSIN	06-19-97
GOV. INSPECTION AGENCY	RONALD DEBLASIO	6-19-97

	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT
1	ET89/LWT82_[7/10/95]:		CONFIGURATION INFO.							------ BASE LINE CAL------									---------- MAST BUILD TESTING ------						
2																									
3	TEST DATE									12/11/95				10/23/96					10/23/96						
4			SENSOR					*(6) VEN		TP-7K101-HA				TP-7J01-FT					TP-7J01-FT					7J01-FT	
5	MAST S/N	564520	REF	INT	AVG		CALC	ATP	Before	TEST	TEST	CALC		1st SPLICE					2nd SPLICE					Δ 1ST/2ND	
6	NOMEN	CONN/PIN	DESIG	RES	RES	S/N	68°F	68°F	Clean	RES	TEMP	68°F	Δ ATP	TEST	TARE	TEMP	CALC	Δ BLD/1	TEST	TARE	TEMP	CALC	Δ BLD/2	TEST	CALC
7	LH2 LEV #1	J33-A,B	302A14	1.3	2.2	2241	132.5	132.82	134.66	133.86	72.45	132.5	-0.3	133.75	'	69.66	132.4	-0.1	134.41	'	69.74	132.4	-0.1	-0.7	0.0
8	LH2 LEV #2	J33-P,R	302A15	1.3	2.0	2243	132.5	132.62	134.47	133.83	72.54	132.5	-0.1	133.76	'	69.84	132.4	-0.1	134.42	'	69.90	132.4	-0.1	-0.7	0.0
9	LH2 LEV #3	J23-A,B	302A16	1.3	2.5	2244	132.8	132.92	134.76	134.11	72.58	132.8	-0.2	134.03	'	69.50	132.7	0.0	134.64	'	69.55	132.7	0.0	-0.6	0.0
10	LH2 LEV #4	J23-P,R	302A17	1.3	2.6	2245	132.2	132.96	133.97	133.53	72.65	132.2	-0.6	133.23	'	69.38	132.0	-0.2	133.82	'	69.43	131.9	-0.2	-0.6	0.0
11	LH2 5%	J23-H,c	302A05	0.6	2.2	2240	132.4	132.62	133.97	133.70	72.44	132.4	-0.2	133.34	'	69.30	132.4	0.0	133.72	'	69.54	132.4	0.0	-0.4	0.0
12	TEST DATE									02/13/96				2/19/96, 8/26/96					2/19/96, 8/26/96						
13								*(6) VEN																	
14	MAST S/N	384490	REF	INT	AVG		CALC	ATP	Before	TEST	TEST	CALC		* (5)			1st SPLICE		* (5)			2nd SPLICE		Δ 1ST/2ND	
15	SENSOR	CONN/PIN	DESIG	RES	RES	S/N	68°F	68°F	Clean	RES	TEMP	68°F	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
16	LH2 98%#1	J33-u,DD	302A07	0.7	4.7	2246	131.5	132.18	133.57	133.05	73.28	131.5	-1.3	133.17	'	72.40	131.3	-0.2	133.60	'	72.50	131.4	-0.1	-0.4	0.0
17	LH2 98%#2	J23-q,CC	302A06	0.7	5.1	2242	132.8	132.80	134.63	134.34	73.20	132.8	0.0	134.42	'	72.40	132.5	-0.3	134.80	'	72.50	132.5	-0.3	-0.4	0.0
18	LH2 100%(-)	J33-J,d	302A11	0.7	4.5	2250	132.6	132.61	134.63	134.24	73.71	132.6	-0.1	133.32	'	69.33	132.4	-0.2	133.55	'	69.31	132.3	-0.3	-0.2	0.1
19	LH2 100%#1	J23-p,BB	302A09	0.7	5.0	2248	132.5	132.48	133.97	134.12	73.43	132.5	0.0	132.93	'	69.67	131.9	-0.6	133.14	'	69.52	131.8	-0.7	-0.2	0.1
20	LH2 100%#2	J33-EE,HH	302A08	0.7	4.4	2247	132.2	132.71	133.97	133.77	73.40	132.2	-0.5	132.62	'	70.46	131.4	-0.8	132.87	'	70.28	131.3	-0.9	-0.3	0.0
21	LH2 100%(+)	J23-e,v	302A10	0.7	5.0	2249	133.1	133.26	135.06	134.74	73.55	133.1	-0.2	133.60	'	69.41	132.6	-0.5	133.81	'	*69.41*	132.5	-0.6	-0.2	0.1
22	LH2 OF	J33-T,n	302A12	0.5	4.5	2251	133.0	132.41	135.12	134.72	73.75	133.0	0.6	133.36	'	69.33	132.5	-0.5	133.55	'	69.40	132.4	-0.6	-0.2	0.1
23	TEST DATE									11/06/95				11/07/95					11/07/95						
24								*(6) VEN																	
25	MAST S/N	346260	REF	INT	AVG		CALC	ATP	Before	TEST	TEST	CALC					1st SPLICE					2nd SPLICE		Δ 1ST/2ND	
26	SENSOR	CONN/PIN	DESIG	RES	RES	S/N	68°F	68°F	Clean	RES	TEMP	68°F	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
27	LO2 5%	J33-H,c	326A05	0.1	4.3	1641	136.9	137.00	137.55	137.73	70.63	136.9	-0.1	138.32	'	73.24	136.5	-0.4	138.48	'	73.23	136.6	-0.3	-0.2	-0.1
28	TEST DATE									07/09/96				07/19/96					07/19/96						
29								*(6) VEN																	
30	MAST S/N	425950	REF	INT	AVG		CALC	ATP	Before	TEST	TEST	CALC					1st SPLICE					2nd SPLICE		Δ 1ST/2ND	
31	SENSOR	CONN/PIN	DESIG	RES	RES	S/N	68°F	68°F	Clean	RES	TEMP	68°F	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
32	LO2 98%#1	J23-u,DD	326A07	0.3	6.2	1661	132.65	133.06	133.06	134.36	73.79	132.6	-0.4	134.65	'	74.40	132.5	-0.2	134.87	'	74.50	132.6	-0.1	-0.2	-0.1
33	LO2 98%#2	J33-q,CC	326A06	0.2	5.6	1659	132.66	132.70	132.70	134.38	73.82	132.7	0.0	134.64	'	74.20	132.6	-0.1	134.78	'	74.20	132.6	-0.1	-0.1	0.0
34	LO2 100%(-)	J23-J,d	326A08	0.3	6.2	1662	133.56	133.35	133.35	135.33	73.95	133.6	0.2	135.14	'	74.50	132.9	-0.6	135.33	'	74.40	133.0	-0.5	-0.2	-0.1
35	LO2 100%#1	J33-p,BB	326A09	0.2	5.8	1663	132.57	133.55	133.55	134.34	73.98	132.6	-1.0	134.17	'	74.40	132.0	-0.5	134.36	'	74.50	132.1	-0.5	-0.2	0.0
36	LO2 100%#2	J23-EE,HH	326A10	0.2	6.3	1664	132.75	132.80	132.80	134.52	73.99	132.7	-0.1	134.50	'	74.50	132.3	-0.4	134.74	'	74.60	132.4	-0.3	-0.2	-0.1
37	LO2 100%(+)	J33-e,v	326A11	0.2	5.8	1666	132.90	132.90	132.90	132.12	74.18	130.3	0.0	134.80	'	74.60	132.6	-0.3	135.02	'	74.60	132.7	-0.2	-0.2	-0.1
38	LO2 OF	J23-T,n	326A12	0.2	6.2	1665	133.78	132.90	132.90	135.62	74.16	133.8	0.9	135.28	'	74.70	133.1	-0.7	134.46	'	74.70	132.2	-1.6	0.8	0.9
39	TEST DATE									02/13/96				2/19/96, 8/26/96					2/19/96, 8/26/96						
40	ICE PT	100.02030																							
41	ALPHA	.00391444																							
42	MAST S/N	384490	REF	INT	AVG		CALC	VEN									1st SPLICE					2nd SPLICE		Δ 1ST/2ND	
43	SENSOR	CONN/PIN	DESIG	RES	RES	S/N	68°F	ATP	Before	TEST	TEST	CALC													
								68°F	Clean	RES	TEMP	68°F	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
44	LH2 ULL TEMP	J23-L,M	302A13		2.8	28	108.1	107.9	'	109.53	73.82	108.1	-0.2	108.45	'	69.52	69.3	0.2	108.66	'	69.58	70.2	-0.7	-0.2	-1.0
45	LH2 ULL TEMP	J23-L,N	302A13		2.8					VEN 60°	VEN 80°			108.44	'				N/A	'					
46	ULL SENSE	J23-M,N	302A13	*0.1*						106.190	110.579			*0.32*	'				*0.32*	'					
47	TEST DATE									07/09/96				07/19/96					07/19/96						
48	ICE PT	99.94307																							
49	ALPHA	.00391539																							
50	MAST S/N	425950	REF	INT	AVG		CALC	VEN									1st SPLICE					2nd SPLICE		Δ 1ST/2ND	
51	SENSOR	CONN/PIN	DESIG	RES	RES	S/N	68°F	ATP	Before	TEST	TEST	CALC													
								68°F	Clean	RES	TEMP	68°F	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
52	LO2 ULL TEMP	J33-L,M	326A13		3.5	90	108.3	107.9	'	109.9	74.5	108.3	-0.5	109.60	'	74.80	74.6	0.2	109.81	'	74.70	75.5	-0.8	-0.2	-1.0
53	LO2 ULL TEMP	J33-L,N	326A13		3.5					VEN 60°	VEN 80°			109.60	'				N/A	'					
54	ULL SENSE	J33-M,N	326A13	*0.3*						106.110	110.496			0.40	'				0.40	'					
55										°C / °F Vendor Check															
56										135.00	21.0	134.47													

	AU	AV	AW
1	ET89/LWT82_[7/10/95]:		CONFIGURATION INFO.
2			
3	TEST DATE		
4			
5	MAST S/N	564520	REF
6	NOMEN	S/N	DESIG
7	LH2 LEV #1	2241	302A14
8	LH2 LEV #2	2243	302A15
9	LH2 LEV #3	2244	302A16
10	LH2 LEV #4	2245	302A17
11	LH2 5%	2240	302A05
12	TEST DATE		
13			
14	MAST S/N	384490	REF
15	SENSOR	S/N	DESIG
16	LH2 98%#1	2246	302A07
17	LH2 98%#2	2242	302A06
18	LH2 100%(-)	2250	302A11
19	LH2 100%#1	2248	302A09
20	LH2 100%#2	2247	302A08
21	LH2 100%(+)	2249	302A10
22	LH2 OF	2251	302A12
23	TEST DATE		
24			
25	MAST S/N	346260	REF
26	SENSOR	S/N	DESIG
27	LO2 5%	1641	326A05
28	TEST DATE		
29			
30	MAST S/N	425950	REF
31	SENSOR	S/N	DESIG
32	LO2 98%#1	1661	326A07
33	LO2 98%#2	1659	326A06
34	LO2 100%(-)	1662	326A08
35	LO2 100%#1	1663	326A09
36	LO2 100%#2	1664	326A10
37	LO2 100%(+)	1666	326A11
38	LO2 OF	1665	326A12
39	TEST DATE		
40	ICE PT	100.0203	
41	ALPHA	.00391444	
42	MAST S/N	384490	REF
43	SENSOR	CONN/PIN	DESIG
44	LH2 ULL TEMP	28	302A13
45	LH2 ULL TEMP	J23-L,N	302A13
46	ULL SENSE	J23-M,N	302A13
47	TEST DATE		
48	ICE PT	99.9	
49	ALPHA	.0039154	
50	MAST S/N	425950	REF
51	SENSOR	CONN/PIN	DESIG
52	LO2 ULL TEMP	90	326A13
53	LO2 ULL TEMP	J33-L,N	326A13
54	ULL SENSE	J33-M,N	326A13
55			
56			

	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI
	Δ CON/1					Δ CON/2						
8/26/96	*(5) TP-6C148-HA LH2 FWD CONF					09/05/96 *(5) TP-6C149-HA LH2 FWD CONF					6C148/149-HA Δ	
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
	133.58	.26	73.65	131.0	-0.5	133.51	'	73.85	131.1	-0.4	0.1	-0.1
	134.92	.28		132.3	-0.5	134.87	'		132.4	-0.4	0.0	-0.1
	134.73	.27		132.2	-0.4	134.56	'		132.2	-0.4	0.2	0.0
	134.11	.26		131.5	-1.0	133.91	'		131.5	-1.0	0.2	0.0
	134.12	.26		131.6	-0.6	133.77	'		131.4	-0.8	0.4	0.2
	134.91	.27		132.3	-0.8	134.69	'		132.3	-0.8	0.2	0.0
	134.81	.27		132.4	-0.7	134.59	'		132.3	-0.7	0.2	0.0
11/07/95	TP-6C148-HA LO2 AFT CONF					11/09/95 TP-6C149-HA LO2 AFT CONF					6C148/149-HA Δ	
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
	138.48	0.24	73.48	136.6	-0.4	138.24	'	72.56	136.8	-0.1	0.2	-0.3
07/23/96	TP-6C148-HA LO2 FWD CONF					07/23/96 TP-6C149-HA LO2 FWD CONF					6C148/149-HA Δ	
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
	134.47	.27	74.12	132.3	-0.4	134.90	'	75.89	132.4	-0.3	-0.4	-0.1
	134.63	.27		132.5	-0.2	135.04	'		132.5	-0.1	-0.4	-0.1
	135.09	.26		132.9	-0.7	135.32	'		132.8	-0.8	-0.2	0.1
	134.10	.25		131.9	-0.6	134.36	'		131.9	-0.7	-0.3	0.0
	134.51	.25		132.3	-0.4	134.74	'		132.3	-0.5	-0.2	0.1
	134.76	.25		132.6	-0.3	135.00	'		132.5	-0.4	-0.2	0.1
	135.10	.26		133.0	-0.8	135.39	'		133.0	-0.8	-0.3	0.0
8/26/96	TP-6C148-HA LH2 FWD CONF					09/05/96 TP-6C149-HA LH2 FWD CONF						
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ		
	109.43	.27	73.70	73.7	0.0	109.23	'	74.46	73.9	0.6		
	N/A	'				109.23	'					
	0.35	.26				0.11	'					
07/23/96	TP-6C148-HA LO2 FWD CONF					07/23/96 TP-6C149-HA LO2 FWD CONF						
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ		
	109.50	.26	72.90	74.1	-1.2	109.66	'	75.97	75.9	0.1		
	N/A	'				109.66	'					
	.40	.26				.17	'					

	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU
	——INSTALLATION TESTING——											
10/24/96	TP-6C126-FT LH2 AFT CNF					10/24/96 TP-6C126-FT LH2 AFT INST					TP-6C126-FT DELTA INST	
	TEST	TARE	TEMP	CALC	Δ BNCH	TEST	TARE	TEMP	CALC	Δ INST	TEST	CALC
	134.15	.23	69.50	132.2	-0.3	134.29	.23	69.50	132.4	-0.2	-0.1	-0.1
	134.10	.22		132.2	-0.3	134.21	.22		132.3	-0.2	-0.1	-0.1
	134.60	.22		132.7	-0.1	134.52	.22		132.6	-0.1	0.1	0.1
	133.90	.22		132.0	-0.2	133.77	.22		131.9	-0.3	0.1	0.1
	133.26	.22		132.0	-0.4	133.37	.22		132.1	-0.3	-0.1	-0.1
03/19/97	TP-7C09-FA LH2 FWD CNF					03/20/97 TP-7C06-FA LH2 FWD INST					7C09/7CO6 DELTA INST	
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
	132.72	.21	71.90	130.6	-0.9	131.87	.20	68.87	130.7	-0.8	0.8	0.0
	134.70	.25		132.6	-0.2	133.87	.21		132.7	-0.1	0.8	-0.1
	134.36	.23		132.3	-0.3	133.65	.20		132.5	0.0	0.7	-0.2
	133.61	.22		131.6	-1.0	132.98	.21		131.8	-0.7	0.6	-0.3
	133.42	.29		131.3	-0.9	132.73	.20		131.6	-0.6	0.7	-0.3
	134.29	.21		132.2	-0.9	133.58	.20		132.4	-0.7	0.7	-0.2
	134.35	.21		132.4	-0.6	133.52	.20		132.5	-0.5	0.8	-0.1
1/22/96	TP-6C125-FT LO2 AFT CNF					01/22/96 TP-6C127-FT LO2 AFT VER					6C125/6C127 DELTA INST	
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
	136.6	.35	65.76	137.2	0.2	136.7	.35	66.60	137.0	0.1	-0.1	0.1
03/05/97	TP-7C08-FA LO2 FWD CNF					03/07/97 TP-7C05-FA LO2 FWD INST					7C08/7CO5 DELTA INST	
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	TEST	CALC
	134.16	.23	73.6	132.1	-0.5	134.1	.23	73.2	132.2	-0.4	0.0	-0.1
	134.36	.24		132.3	-0.3	134.4	.24		132.4	-0.2	0.0	-0.1
	134.74	.24		132.7	-0.9	134.8	.24		132.8	-0.7	0.0	-0.2
	133.71	.23		131.7	-0.9	133.8	.23		131.9	-0.7	0.0	-0.2
	134.16	.22		132.2	-0.6	134.2	.25		132.3	-0.5	0.0	-0.1
	134.53	.23		132.5	-0.4	134.6	.24		132.6	-0.3	0.0	-0.1
	134.25	.23		132.3	-1.5	134.1	.25		132.3	-1.5	0.1	0.0
03/19/97	TP-7C09-FA LH2 FWD CNF					03/20/97 TP-7C06-FA LH2 FWD INST						
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	DELTA INST TEST	CALC
	109.03	.20	72.78	71.9	0.9	108.37	.20	68.59	68.9	-0.3	0.7	3.0
	N/A	'				N/A	'					
	0.33	.20				0.33	.20					
03/05/97	TP-7C08-FA LO2 FWD CNF					03/07/97 TP-7C05-FA LO2 FWD INST						
	TEST	TARE	TEMP	CALC	Δ	TEST	TARE	TEMP	CALC	Δ	DELTA INST TEST	CALC
	109.39	.23	74.00	73.6	0.4	109.3	.24	73.3	73.2	0.1	0.1	0.5
	N/A	'				N/A	'					
	0.40	.23				0.4	.24					

	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR
1	ET89/LWT82_[7/10/95]:				-------			SYSTEM TESTING CALC. CBL RES. AND DEVIATION FROM EXPECTED ----------															
2																							
3	TEST DATE			05/05/97				05/16/97				06/17/97				XX-XX-XX				XX-XX-XX			
4				TP-7C07-FA				TP-6C105-AT / Part 7				TP-6D105-AT / Part 4				TP-6D101-MC / Part II				FILE IV			
5	MAST S/N	564520	REF	FINAL ASSY				BLDG 420				BLDG 420				MODCENTER				KSC			
6	NOMEN	CONN/PIN	DESIG	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ
7	LH2 LEV #1	J33-A,B	302A14	135.6	0.0	1.4	-0.8	135.0	0.0	1.5	-0.7	134.8	0.0	1.6	-0.6	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
8	LH2 LEV #2	J33-P,R	302A15	135.5	0.0	1.4	-0.6	134.9	0.0	1.5	-0.5	134.8	0.0	1.6	-0.5	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
9	LH2 LEV #3	J23-A,B	302A16	136.3	0.0	1.9	-0.6	135.7	0.0	2.0	-0.5	135.6	0.0	2.1	-0.4	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
10	LH2 LEV #4	J23-P,R	302A17	135.6	0.0	1.8	-0.8	135.0	0.0	1.9	-0.7	134.8	0.0	2.0	-0.6	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
11	LH2 5%	J23-H,c	302A05	135.3	0.0	1.3	-0.9	134.7	0.0	1.4	-0.8	134.5	0.0	1.4	-0.7	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
12	TEST DATE																						
13																							
14	MAST S/N	384490	REF	FINAL ASSY				BLDG 420				BLDG 420				MODCENTER				KSC			
15	SENSOR	CONN/PIN	DESIG	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ
16	LH2 98%#1	J33-u,DD	302A07	136.6	0.0	3.5	-1.2	135.9	0.0	3.5	-1.1	135.7	0.0	3.5	-1.1	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
17	LH2 98%#2	J23-q,CC	302A06	139.1	0.0	4.7	-0.5	138.4	0.0	4.7	-0.4	138.2	0.0	4.7	-0.4	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
18	LH2 100%(-)	J33-J,d	302A11	138.4	0.0	4.2	-0.3	137.7	0.0	4.3	-0.2	137.6	0.0	4.3	-0.2	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
19	LH2 100%#1	J23-p,BB	302A09	138.2	0.0	4.0	-1.0	137.6	0.0	4.1	-0.9	137.4	0.0	4.2	-0.9	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
20	LH2 100%#2	J33-EE,HH	302A08	137.5	0.0	3.7	-0.7	136.8	0.0	3.8	-0.6	136.7	0.0	3.8	-0.6	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
21	LH2 100%(+)	J23-e,v	302A10	138.8	0.0	4.1	-0.9	138.2	0.0	4.2	-0.8	138.0	0.0	4.2	-0.8	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
22	LH2 OF	J33-T,n	302A12	138.3	0.0	3.6	-0.9	137.7	0.0	3.7	-0.8	137.5	0.0	3.8	-0.7	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
23	TEST DATE																						
24																							
25	MAST S/N	346260	REF	FINAL ASSY				BLDG 420				BLDG 420				MODCENTER				KSC			
26	SENSOR	CONN/PIN	DESIG	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ
27	LO2 5%	J33-H,c	326A05	142.2	0.0	3.5	-0.8	141.6	0.0	3.6	-0.7	141.6	0.0	3.6	-0.7	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
28	TEST DATE																						
29																							
30	MAST S/N	425950	REF	FINAL ASSY				BLDG 420				BLDG 420				MODCENTER				KSC			
31	SENSOR	CONN/PIN	DESIG	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ	TEST	TARE	CALC	Δ
32	LO2 98%#1	J23-u,DD	326A07	140.1	0.0	5.7	-0.6	139.5	0.0	5.8	-0.5	139.5	0.0	5.8	-0.4	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
33	LO2 98%#2	J33-q,CC	326A06	139.8	0.0	5.4	-0.2	139.2	0.0	5.5	-0.1	139.2	0.0	5.5	-0.1	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
34	LO2 100%(-)	J23-J,d	326A08	140.6	0.0	5.2	-1.0	139.9	0.0	5.3	-0.9	139.9	0.0	5.3	-0.9	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
35	LO2 100%#1	J33-p,BB	326A09	139.0	0.0	4.7	-1.1	138.4	0.0	4.8	-1.0	138.4	0.0	4.8	-1.0	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
36	LO2 100%#2	J23-EE,HH	326A10	140.0	0.0	5.4	-0.9	139.3	0.0	5.5	-0.8	139.3	0.0	5.6	-0.8	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
37	LO2 100%(+)	J33-e,v	326A11	139.8	0.0	5.2	-0.6	139.2	0.0	5.3	-0.5	139.2	0.0	5.3	-0.5	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
38	LO2 OF	J23-T,n	326A12	139.9	0.0	4.3	-1.9	139.3	0.0	4.4	-1.8	139.3	0.0	4.4	-1.8	'	'	#VALUE!	#VALUE!	'	'	#VALUE!	#VALUE!
39	TEST DATE																						
40	ICE PT	100.0																					
41	ALPHA	.0039144																					
42	MAST S/N	384490	REF	FINAL ASSY				BLDG 420				BLDG 420				MODCENTER				*(d)		KSC	
43	SENSOR	CONN/PIN	DESIG	TEST	TARE	CALC	TEMP	TEST	TARE	CALC	TEMP	TEST	TARE	CALC	TEMP	TEST	TARE	CALC	TEMP	TEST	TARE	CALC	TEMP
44	LH2 ULL TEMP	J23-L,M	302A13	111.9	0.0	73.6	72.2	111.3	0.0	71.1	71.3	111.2	0.0	70.5	70.0	'	0.0	#VALUE!	'	'	'	#VALUE!	'
45	LH2 ULL TEMP	J23-L,N	302A13	111.9	0.0	BIAS		111.3	0.0	BIAS		111.2	0.0	BIAS		'	'	BIAS		'	'	BIAS	
46	ULL SENSE	J23-M,N	302A13	2.8	0.0	0.0		2.8	0.0	0.0		2.8	0.0	0.0		'	0.0	0.0		'	'	0.0	
47	TEST DATE																						
48	ICE PT	99.9																					
49	ALPHA	.0039154																					
50	MAST S/N	425950	REF	FINAL ASSY				BLDG 420				BLDG 420				MODCENTER				*(d)		KSC	
51	SENSOR	CONN/PIN	DESIG	TEST	TARE	CALC	TEMP	TEST	TARE	CALC	TEMP	TEST	TARE	CALC	TEMP	TEST	TARE	CALC	TEMP	TEST	TARE	CALC	TEMP
52	LO2 ULL TEMP	J33-L,M	326A13	112.6	0.0	73.9	73.0	112.0	0.0	71.5	71.2	112.0	0.0	71.5	72.0	'	0.0	#VALUE!	'	'	'	#VALUE!	'
53	LO2 ULL TEMP	J33-L,N	326A13	112.6	0.0	BIAS		112.0	0.0	BIAS		112.0	0.0	BIAS		'	'	BIAS		'	'	BIAS	
54	ULL SENSE	J33-M,N	326A13	3.5	0.0	0.0		3.5	0.0	0.0		3.5	0.0	0.0		'	0.0	0.0		'	'	0.0	
55																							
56																							

	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO

1 ET89/LWT82_[7/10/95]:

2 **EQUATIONS FOR ET LEVEL AND TEMPERATURE SENSORS(RTS)**

3

4 ∂ = Alpha (Temperature coefficient of wire in ohms/ohm/°) **AND** RTamb = Ro * (1 + ∂T°C * (Tamb°C)) --- PRT Handbook where ∂T°C = .00392 ohm/ohm/°C

5

6 R20°C = RLamb - ∂L°C * RLamb * (Tamb°C - 20°C) --- [Level sensor spec] **REARRANGING** R20°C = RLamb * (1 + ∂L°C * (20°C - Tamb°C)) **AND** R68° = RLamb * (1 + ∂L°C * (36°F - Tamb°F)

7 RTamb = Ambient resistance of temp sensor ∂T°C = nominal .00392 for temp sensor in ohms/ohm/°C Ro =100ohms = Nominal ullage temperature sensors resistance at 0°C (32°F)

8 RLamb = Ambient resistance of level sensor ∂°C = 0.00396 for level sensors in ohms/ohm/°C R20°C = Nominal 140 ohms for level sensor at 20°C (68°F)

9

10 °C = (°F - 32°) / 1.8 **OR** °F =1.8°C + 32° **THEN** 1.8=°C/(°F-32°) **AND** 20°C = 68°F **OR** 36°F is equivalent to 20°C (Ratio of 1.8)

11

12 **REARRANGING TEMP SENSOR EQUATION** ∂T°C= (RTamb-Ro)/Tamb°C*Ro) **SUBSTITUTING T°F** ∂T°C = (RTamb - Ro) / ((Tamb°F - 32°) / 1.8) * Ro

13

14 **OR** ∂T°C / 1.8 = ∂T°F = (RTamb - Ro) / (Tamb°F - 32°) * Ro **THEREFORE** ∂T°F = 0.00396/1.8 for level sensors in ohms/ohms/°F

15

16 **OR FOR ULLAGE SENSORS** 1) Tamb°F $\frac{1.8 * Ro * (RTamb - 100)}{∂°C}$ **AND** 2) Tamb°C= $\frac{Ro * (RTamb - 100)}{∂°C}$

17

18 **SUBSTITUTING °F AND ∂°F INTO LEVEL SENSOR EQUATION** 3) R20°C = R68°F = RLamb * (1 - ((∂L°C /1.8) * (((Ro) * (RTamb - Ro) / (∂T°C / 1.8)) - 36°F)))

19

20 1) For Liquid Level circuit evaluations an R68°F value (reference) is required for each sensor because of the temperature sensitivity of the sensor, the large range of

21 acceptable 68°F values and the large span of temperatures when tests are made. This reference must be established when all other parameters are known. This value

22 may then be; a) Compared to a vendor calculated 68°F value or a previous test value, and b) Used as an in-house reference for subsequent tests.

23 2) On a buttoned up tank (complete circuits/umbilical to sensor) calculations are made of cable harnesses. Assumptions in calculations a) A constant 68°F reference value for each sensor (1 above)

24 b) Known test cable resistance (measured).

25

26 **THE GENERAL EQUATION USED ON THE TANK IS AS FOLLOWS**

27 a) RTamb = Total Measured Resistance (TMRT) - Test Cable Resistance (TCR) - ET Cable Resistance (ETCRT) for temp sensor circuit

28 b) RLamb = Total Measured Resistance (TMRL) - Test Cable Resistance (TCR) - ET Cable

29

30 **SUBSTITUTING INTO THE EQUATION 3) ABOVE, ET CABLE RESISTANCE (ETCRL) FOR LEVEL SENSOR CIRCUIT IS DERIVED BY:**

31

32 ETCRL = TMRL - TCR - R68°F / (1 - ((∂°c / 1.8) * (((1.8 / Ro) * (TMRT - TCR - ETCRT - Ro) / ∂T°C) - 36°F))) **WHERE** (1.8 / Ro) * (TMRT - TCR - ETCRT - Ro) / ∂T°C) is amb temp

33 NOTE: Test cabe resistence (TCR) may be automatically removed from Total measured resistance TMRL (Use of Tares) during some testing.

34

35 Excel program techniques: In all equations cell location is defined, i.e., I7 is column I row 7, J7 is column J row 7, etc. Data is collected from the appropriate cells and the functions described

36 are performed on the data, i.e., I7-I46 simply subtracts the data in I46 from I7. The $ sign controls how copy and paste functions work only.

37

38 a) Typical equation using Excel for determining R68°F in-house. Temperature and test cable b) Typical equation using Excel for determining cable (harness) resistance---Rows

39 resistance are known. 7K1O1 (individual sensor) is used as reference. 7JO1, HA, and cells are as defined in a)

40 6C, & 7C Mast Tests are compared to 7K1O1. Possible changes in level sensor are monitored.

41

42 7K1O1 R68°F = AD7 * (1 - (0.00396 / 1.8 * (AF7 - 68)))

43 Mast Tests R68°F = (AN7 - $Y7 - (AN$46 - $Y$46)) * (1 - ((0.00396 / 1.8) * (AP7 - 68)))

44

45 **WHERE for 7K101:**

46 AD7 is Total circuit resistance (TMRL)

47 AF7 is measured ambient temperature

48 68 is 68°F, .00396 is ∂L, & 1.8 is °C to °F conversion Factor

49 **AND for MAST TESTS:**

50 AM7 is Total circuit resistance (TMRL)

51 $Y7 is known internal tank circuit resistance

52 AN$46 is RT (3rd wire) total circuit resistance (TMRT)

53 $Y$46 is internal tank circuit resistance of level sensor

54 AN$46-$Y$46 results in Test Cable Resistance

55 AP7 is measured ambient temperature

56 68 is 68°F, .00396 is ∂L, & 1.8 is °C to °F conversion factor

ET HARNESS RESISTANCE=

(BY7-((BY$46-BZ$46)-$Z$44)-CA$46-BZ7-$AB7/(1-((0.00396/1.8)*(((1.8/$W$40)*(((BY$44-BZ$44+BY$45-BZ$45)/2)-(BY$46-BZ$46)-CA$46-$W$40)/$W$41)-36))))

WHERE for ET HARNESSES:

BY7 is Total circuit resistance (TMRL) of level sensor

((BY$46-BZ$46)-$Z$44) is TCR (Test Cable resistance) - see note above

CA$46 is bias value used during analysis

$AB7 is 68°F resistance (reference) of level sensor

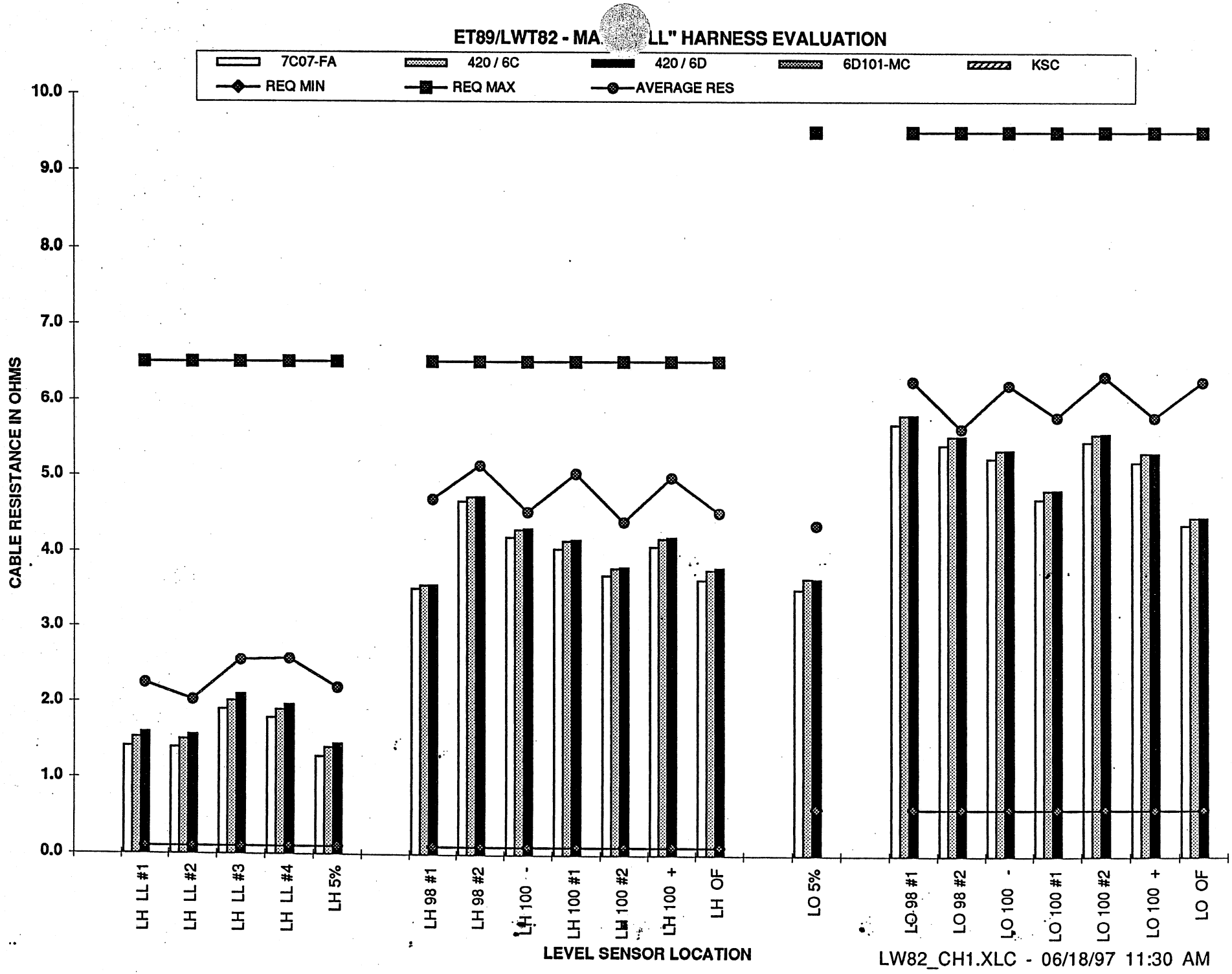
((BY$44-BZ$44+BY$45-BZ$45)/2) is average of two measurements made on RT circuit

BY$46 is RT (3rd wire) total circuit resistance (TMRT)

CA$46 is bias value used during analysis

$W$40 is actual vendor cal (Ro) on RT

$W$41 is actual vendor calcalculated alpha (∂) on RT


ET89/LWT82 - MA LL" HARNESS EVALUATION
7C07-FA
420 / 6C
420 / 6D
6D101-MC
KSC
REQ MIN
REQ MAX
AVERAGE RES
CABLE RESISTANCE IN OHMS
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
LH LL #1
LH LL #2
LH LL #3
LH LL #4
LH 5%
LH 98 #1
LH 98 #2
LH 100 -
LH 100 #1
LH 100 #2
LH 100 +
LH OF
LO 5%
LO 98 #1
LO 98 #2
LO 100 -
LO 100 #1
LO 100 #2
LO 100 +
LO OF
LEVEL SENSOR LOCATION
LW82_CH1.XLC - 06/18/97 11:30 AM

SECTION VI

NON FLIGHT HARDWARE/TEMPORARY INSTALLATION LOG

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW

PART NUMBER: 80900000041-OP110

MFG. ENGR: M MORGAN DATE: 08/30/96

Q.C. ENGR: T. DOWDY DATE: 09/24/96

MPP TYPE: LOG

EFFECTIVITY: LWT 81 - 83

PART NAME: SUPPORT EQUIP INST AND REMOVAL RECORD

NOTES:

ENGR. CHG. LEVEL: EK

SERIALIZED ITEM: YES

SCID ITEM: NO

CONTROL POINT: 1010

SAFETY HAZARDS INVOLVED: YES

LEVEL 1 GRAPHICS REQUIRED: NO

SEQUENCE CRITICAL STEPS - NO

INDEX DATA

SV ITEMS 1 3 & 4 6/19/97

BILL OF MATERIALS
LIST OF SUPPORT DOCUMENTS
LIST OF PROCESS MATERIALS
GENERAL NOTES/SAFETY WARNINGS/CAUTIONS
OPERATIONS SHEETS
STANDARDS SUMMARY SHEET
RECORD OF REVISIONS

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

BILL OF MATERIAL

NOTES:

NI	ET	IT	QTY	U/M	PART NUMBER	NOTE	SCID	DESCRIPTION
	CE		0007	EA	KSC-FORM4-226			3" X 12" NON-FLIGHT TAG (RED STREAMER)

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW

PART NUMBER: 80900000041-OP110

LIST OF SUPPORT DOCUMENTS

NOTES:

DOCUMENT NUMBER	REV. LEVEL	DESCRIPTION
P78-3101		TOOL INSTRUCTION MANUAL
P78-3156		TOOL INSTRUCTION MANUAL
P78-3176		TOOL INSTRUCTION MANUAL
P78-3177		TOOL INSTRUCTION MANUAL
80900000031		ENGINEERING DRAWING
80900000041		ENGINEERING DRAWING

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

LIST OF PROCESS MATERIALS

NOTES:

QTY	U/M	PART NUMBER	STEP	NOTE	DESCRIPTION
A/R	FT	T1-170007X6	0002		1/16 DIA WIRE ROPE
A/R	EA	T1-170656	0002		NICROPRESS SLEEVE 1/16 DIA
A/R	EA	TI-082601	0002		SHRINK TUBING
A/R	EA		0002		TY WRAPS

GENERAL NOTES/SAFETY WARNINGS/CAUTIONS

1. OBSERVE WALKING LOAD LIMITATIONS PER DWG 80900000031.

2. ALL PERSONNEL WORKING ABOVE OTHER PERSONNEL AND/OR FLIGHT HARDWARE SHALL USE TETHERED TOOLS AND EQUIPMENT. SUPERVISORS SHALL ENFORCE THIS TETHERING REQUIREMENT.

SAFETY NOTICE

3. THIS PROCESS CONTAINS HAZARDOUS STEPS. IT IS MANDATORY THAT ALL PERTINENT SAFETY PRECAUTIONS BE REVIEWED AND THAT PRESCRIBED PERSONNEL PROTECTIVE EQUIPMENT BE WORN AS INDICATED IN THE SAFETY STATEMENTS. REVIEW ALL PERTINENT CAUTION STATEMENTS FOR POTENTIAL HARDWARE DAMAGE CONCERNS.

4. WHERE THE SAFETY PRECAUTIONS ARE NOT FULLY UNDERSTOOD, OR WHERE PERSONNEL PROTECTIVE EQUIPMENT IS PRESCRIBED, THE LEVEL II TIE CODE WILL BE USED TO VIEW THE COMPLETE VERSION OF THE SAFETY STEP. THE AREA SUPERVISOR IS RESPONSIBLE FOR ENFORCEMENT OF THESE REQUIREMENTS.

5. OBSERVERS, INSPECTORS AND SUPERVISORY PERSONNEL WHO PARTICIPATE IN HAZARDOUS OPERATIONS AND ARE SUBJECTED TO THE SAME HAZARDS AS THE OPERATORS, SHALL WEAR THE PROTECTIVE EQUIPMENT IDENTIFIED AS REQUIRED FOR HAZARDOUS OPERATIONS.

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
83207A 6/14/97 ------ SHOP	PICK	0001	PICK REQUIRED ITEMS FROM BOM (REF. COPICS PICK LIST)
83054A 6/19/97 ------ SHOP	SCC5	0002	STAGE REQUIRED ITEMS (REF. COPICS ROUTING RTOL/RTMA)
58364A 5/12/97 ------ SHOP	COEM	0005	DWG SHT 15 AND 35B, ITEM 70 (APPROX STA 2058 +Y SIDE) REMOVE PREVIOUSLY INSTALLED PROTECTIVE PACKAGING PRIOR TO LEAK TESTING/HELIUM INJECT BOX AND COVER INSTALLATION.
81186A 6/20/97 ------ SHOP	COEM	0010	REMOVE PREVIOUSLY INSTALLED PROTECTIVE PACKAGING PRIOR TO INSTALLING NOSE CONE LOUVER AND FAIRING COVERS (ITEMS "DJ", "DK" AND "DL").

81186A 6/19/97 DK ONLY 6/19/97

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
			CAUTION TOOL OPERATIONS HAZARD (SCEQ079-2) (SCHA006-2
81186A 6/20/97 ------ SHOP	COEM	0015	REF DWG 80900000041, ITEMS DJ & DK AND FLAG NOTE 96 INSTALL P78-3176 NOSE CONE LOUVER PROTECTIVE COVERS SEE (P78-3176 FIGURE 1) (P78-3176 4.1)
DK ONLY 81186A JUN 19 '97			**CAUTION** TOOL OPERATIONS HAZARD (SCEQ079-2) (SCHA006-2
81186A ------ SHOP JUN 19 '97	COEM	0020	REF DWG 80900000041, ITEM DL. INSTALL P78-3177 NOSE CONE FAIRING PROTECTIVE COVER SEE (P78-3176 FIGURE 2) (P78-3176 4.2)
MSS 111 6/20/97 ------ QCBC	QC20	0021	INSPECT TO ENSURE PROTECTION APPLIED TO ITEMS DJ, DK AND DL PER DWG.
MSS 146 6-19-97 DK + DL ONLY			
81186A ------ SHOP JUN 24 '97	COEM	0025	DWG SHTS 36 THRU 75 VERIFY/INSTALL FOLLOWING TOOLING AND PACK AND SHIP EQUIPMENT AT NOTED LOCATIONS. REF DWG SHEETS 36 AND 37 FOR ITEM LOCATIONS ON ET. DWG SHTS 9, 15 AND 35C THRU 35H VERIFY DESIGNATED AREA(S) PROTECTED WITH COVERING/TAPE, TIE WRAP, CONNECTOR CAPS OR ELEPHANT HIDE (K499A) AS APPLICABLE. REF DWG SHEET 9 FOR ITEM LOCATIONS ON ET. INCREMENTAL BUYOFFS FOLLOW
MSS 132 ------ QCBC JUN 24 '97	QC20	0026	INSPECT TO ENSURE PROTECTION APPLIED TO ITEMS LISTED ON INCREMENTAL BUYOFF. VERIFY INCREMENTAL BUYOFFS ARE COMPLETE (INSTALLATION ONLY AND REMOVAL WHERE9SPECIFIED).

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	DESCRIPTION	OPERATIONS INSTALLED SHOP	OPERATIONS INSTALLED (MAF) QC	OPERATIONS REMOVED SHOP	OPERATIONS REMOVED (OFF-SITE QC
			INTERTANK COMPARTMENT				
BE1	(SHT 59)	14175-2751	LO2 F/L BELLOWS COVER, I/T COMPARTMENT	INSTALLED BY SUPPLIER. REMOVED PER 80901010000-OP22	N/A		N/A
BE2	(SHT 59)	14175-2751	LO2 F/L BELLOWS COVER, I/T COMPARTMENT	INSTALLED BY SUPPLIER. REMOVED PER 80901010000-OP22	N/A		N/A
CP	(SHT 45)	PROT COVER FOR PD7400244-029	I/T COMPARTMENT GAS TEMP #1 (314A31) FLAG NOTE 21	INSTALLED BY SUPPLIER. REMOVED PER 80901010000-OP22	N/A		N/A
CR	(SHT 45)	PROT COVER FOR PD7400244-029	I/T COMPARTMENT GAS TEMP #2 (314A32) FLAG NOTE 21	INSTALLED BY SUPPLIER. REMOVED PER 80901010000-OP22	N/A		N/A
CZ	(SHT 59)	P78-3102-5-101	GH2 VENT LINE BELLOWS COVER, I/T COMPARTMENT	INSTALLED BY SUPPLIER. REMOVED PER 80901010000-OP22	N/A		N/A
DA	(SHT 59)	P78-3102-5-102	GH2 VENT LINE BELLOWS COVER, I/T COMPARTMENT (INCLUDING PROTECTION REQMTS BETWEEN BELLOWS) FLAG NOTE 7	INSTALLED BY SUPPLIER. REMOVED PER 80901010000-OP22	N/A		N/A
			BUYOFF DENOTES ITEM REMOVED FOR ITEM 76A ONLY.				
76A	(SHT 35H)	ET UMBILICAL CARRIER PLATE	PROTECTIVE CAP 314A30 ADAPTER) REMOVED (1 EACH INTERNAL)	82837A MAY 28 '97	MSS 111 MAY 28 '97	N/A	N/A

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW

PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	ITEM	DESCRIPTION	OPERATIONS INSTALLED SHOP	OPERATIONS INSTALLED (MAF) QC	OPERATIONS REMOVED (OFF-SIT SHOP	OPERATIONS REMOVED (OFF-SIT QC
				INTERTANK, EXTERNAL				
			R	(SHT 51) PD4800173-020 PROT COVER AT UMBILICAL CARRIER PLATE	82837A JUN 19 '97	MSS 273 JUN 19 '97		
			S	(SHT 51) PD4800174-020 PROT CAP AT UMBILICAL CARRIER PLATE	82837A JUN 19 '97	MSS 273 JUN 19 '97		
			T	(SHT 51) PD4800174-020 PROT CAP AT UMBILICAL CARRIER PLATE	82837A JUN 19 '97	MSS 273 JUN 19 '97		
			U	(SHT 51) PD4800174-020 PROT CAP AT UMBILICAL CARRIER PLATE	82837A JUN 19 '97	MSS 273 JUN 19 '97		
			V	(SHT 51) PD4800174-020 PROT CAP AT UMBILICAL CARRIER PLATE	82837A JUN 19 '97	MSS 273 JUN 19 '97		
			W	(SHT 51) PD4800174-020 PROT CAP AT UMBILICAL CARRIER PLATE	82837A JUN 19 '97	MSS 273 JUN 19 '97		
			Y	(SHT 51) PD4800174-020 PROT CAP AT UMBILICAL CARRIER PLATE	82837A JUN 19 '97	MSS 273 JUN 19 '97		
			76	(SHT 35H) ET UMBILICAL CARRIER PLATE PROTECTIVE CAPS AT 314W23J2,314W24J3	82837A JUN 19 '97	MSS 273 JUN 19 '97		
				BUYOFF DENOTES ITEM REMOVED FOR ITEM 76A ONLY				
			76A	(SHT 35H) ET UMBILICAL CARRIER PLATE PROTECTIVE CAP 314A30 ADAPTER) REMOVED (1 EACH EXTERNAL)	82837A MAY 28 '97	MSS 111 MAY 28 '97	N/A	N/A
			BA	(SHT 55) P78-3123-3-101 ELECT CABLE SUPPORT STA 970.678 -Y SIDE FLAG NOTE 56	82837A MAY 28 '97	MSS 111 MAY 28 '97		
			CB	(SHT 60) H78-3000 TSE FITTING SRB BEAM -Y SIDE	82837A MAY 28 '97	MSS 111 MAY 28 '97		
			BB	(SHT 55) P78-3123-3-102 ELECT CABLE SUPPORT STA 970.678 +Y SIDE FLAG NOTE 56	82837A MAY 28 '97	MSS 111 MAY 28 '97		
			CC	(SHT 60) H78-3000 TSE FITTING SRB BEAM +Y SIDE	82837A MAY 28 '97	MSS 111 MAY 28 '97		

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW

PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS				
ITEM			DESCRIPTION	INSTALLED SHOP	INSTALLED (MAF) QC	REMOVED SHOP	REMOVED (OFF-SIT QC
			STATION 2058 & AFT ORB HDWR				
J			(SHT 50) P78-3102 EB-3 CLOSURE PLT ASSY STA 2058 -Y UPPER FTG	82837A MAY 29 '97	MAY 29 '97		
L			(SHT 50) P78-3102 EB-5 CLOSURE PLT ASSY STA 2058 -Y UPPER FTG	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BC			(SHT 56 AND 58A) P78-3123-2-101 ELECT CABLE SUPPORT STA 2058 -Y SIDE FLAG NOTE 30	82837A 6/19/97	MSS 273 6/19/97		
N			(SHT 50) P78-3102 EB-7 CLOSURE PLT ASSY STA 2058 -Y LOWER FTG	82837A MAY 29 '97	MSS 123 MAY 29 '97		
G			(SHT 49) P78-3158 BALL FTG COVER STA 2058 -Y SIDE	82837A MAY 29 '97	MSS 123 MAY 29 '97		
AZ			(SHT 53) P78-3108 AFT ORBITER SUPPORT STRUT	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BP			(SHT 69) G078-400001 COVER ASSY 17" DISCONNECT, LH2 FLAG NOTE 8	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BS			(SHT 72) G078-400007-002 COVER ASSY 4" DISCONNECT, LH2	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BT			(SHT 72) G078-400010-002 COVER ASSY 2" DISCONNECT, LH2	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BV			(SHT 72) G078-400020 ADAPTER ASSY, LH2 FLAG NOTE 28 AND 90	82837A MAY 29 '97	MSS 123 MAY 29 '97		
DG			(SHT 74) G078-400073 LH2 PURGE BARRIER SEAL COVER FLAG NOTE 52	82837A MAY 29 '97	MSS 123 MAY 29 '97		
K			(SHT 50) P78-3102 EB-4 CLOSURE PLT ASSY STA 2058 +Y UPPER FTG	82837A MAY 29 '97	MSS 123 MAY 29 '97		

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW

PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS	INSTALLED (MAF) SHOP	INSTALLED (MAF) QC	REMOVED (OFF-SIT SHOP	REMOVED (OFF-SIT QC
ITEM			DESCRIPTION				
M			(SHT 50) P78-3102 EB-6 CLOSURE PLT ASSY STA 2058 +Y UPPER FTG	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BD			(SHTS 56 AND 58A) P78-3123-2-101 ELECT CABLE SUPPORT STA 2058 +Y SIDE FLAG NOTE 30	82837A 6/19/97	MSS 273 6/19/97		
P			(SHT 50) P78-3102 EB-8 CLOSURE PLT ASSY STA 2058 +Y LOWER FTG	82837A MAY 29 '97	MSS 123 MAY 29 '97		
H			(SHT 49) P78-3158 BALL FTG COVER STA 2058 +Y SIDE	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BG			(SHT 67) G078-400010 COVER ASSY 2" DISCONNECT	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BJ			(SHT 67) G078-400020 ADAPTER ASSY, LO2 FLAG NOTE 28 AND 90	82837A MAY 29 '97	MSS 123 MAY 29 '97		
BK			(SHT 67 & 69) G078-400040 COVER ASSY 17" DISCONNECT, LO2 FLAG NOTE 8	82837A MAY 29 '97	MSS 123 MAY 29 '97		
DH			(SHT 70) G078-400077 LO2 PURGE BARRIER SEAL COVER FLAG NOTE 52	82837A MAY 29 '97	MSS 123 MAY 29 '97		
CH			(SHT 69) G078-400067 LO2 ELEC. DISCONNECT COVER ASSY FLAG NOTES 8 AND 31	81186A JUN 24 '97	MSS 132 JUN 24 '97		
CJ			(SHT 69) G078-400067 LH2 ELEC. DISCONNECT COVER ASSY FLAG NOTES 8 AND 31	81186A JUN 24 '97	MSS 132 JUN 24 '97		
CE1			(SHT 46A) P78-3131/-3160 BREATHER ADAPTERS	82837A MAY 28 '97	MSS 111 MAY 28 '97		
CE1			(SHT 46A) P78-3184 PRESSURE MONITORING SYSTEM	82837A MAY 28 '97	MSS 111 MAY 28 '97	REMOVED PER 80900000041-OP1 PRIOR TO SHIPME	

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW

PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	ITEM	DESCRIPTION	OPERATIONS INSTALLED SHOP	OPERATIONS INSTALLED (MAF) QC	OPERATIONS REMOVED (OFF-SIT) SHOP	OPERATIONS REMOVED (OFF-SIT) QC
				TRANSPORTER				
			BF	(SHT 67) G078-400003 COVER PLATE ASSY-BREATHER LO2 FLAG NOTE 94 LOCATED IN BOX NEAR DATA LOGGER MOUNT	82837A MAY 28 '97	MSS 111 MAY 28 '97		
			BR	(SHT 72) G078-400003 COVER PLATE ASSY-BREATHER LH2 FLAG NOTE 94 LOCATED IN BOX NEAR DATA LOGGER MOUNT	82837A MAY 28 '97	MSS 111 MAY 28 '97		
			CD	(SHT 61) H78-3036 AFT SUPPORT TRANSPORTATION FTG TO BARREL AT STA 2058 -Z AXIS	82837A MAY 28 '97	MSS 111 MAY 28 '97		
			CE1	(SHT 47A) P78-3100/P78-3140 ET TRANSPORTER ASSY FLAG NOTE 61 (P78-3140 ONLY)	82837A MAY 28 '97	MSS 111 MAY 28 '97		

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
			* * * CAUTION * * * WHERE TAPE IS CALLED OUT IN THE FOLLOWING STEP AS A METHO FOR ATTACHING PROTECTIVE MATERIAL, IT SHALL BE APPLIED AS ENGINEERING DICTATES.
81186A ------ SHOP JUN 24 '97	COEM	0030	DWG SHTS 9 THRU 35H PRIOR TO APPLICATION OF SHIPPING PROTECTION, PERFORM A VISUAL INSPECTION OF EACH DESIGNATED AREA, HOLE, AND OPENING TO VERIFY NO EVIDENCE OF BLOCKAGE OR CONTAMINATION. VERIFY/APPLY PROTECTION TO NOTED AREAS OF ET PER APPLICABLE FLAG NOTES. REF DWG SHEETS 9 AND 10 FOR ITEM LOCATIONS ON ET. - INCREMENTAL BUYOFFS FOLLOW -
MSS 132 ------ QCBC JUN 24 '97	QC20	0031	INSPECT TO ENSURE NO BLOCKAGE OR CONTAMINATION EXIST ON HOLE OR OPENING PRIOR TO INSTALLATION OF PROTECTION. INSPECT TO ENSURE PROTECTION APPLIED TO ITEMS LISTED ON INCREMENTAL BUYOFF. VERIFY INCREMENTAL BUYOFFS ARE COMPLETE (INSTALLATION ONL

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW

PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS				
			INSTALLED SHOP	(MAF) QC	REMOVED SHOP	(OFF-SITE QC	
ITEM	DESCRIPTION						
13	(SHT 24) GH2 PRESS LINE OPENING I/T STA 1068, 32.5° FLAG NOTE 8		82837A MAY 29 '97	MSS 123 MAY 29 '97			
14	(SHT 25) LO2 FEEDLINE OPENING I/T STA 1038, 23.1° - FLAG NOTE 7 AND 8		82837A MAY 29 '97	MSS 123 MAY 29 '97			
16	(SHT 26) LH2 TANK BIPOD FTG -Y SIDE STA 1129.9 - FLAG NOTE 8		81186A JUN 23 '97	MSS 132 JUN 23 '97			
17	(SHT 26) LH2 TANK BIPOD FTG +Y SIDE STA 1129.9 - FLAG NOTE 8		81186A JUN 23 '97	MSS 132 JUN 23 '97			
33	(SHT 30) BURST DISC AND BELLOWS ON LH2 FEEDLINE - REMOVE BURST DISC PROTECTIVE TOOL COVER - FLAG NOTE 7		82273A 06-24-97	MSS 103 06-24-97	82013A 06-24-97	06-24-97	
35	(SHT 31) BELLOWS ON LH2 RECIRC LINE (UPPER) REMOVE BURST DISC PROTECTIVE TOOL COVER - FLAG NOTE 7		82273A 06-24-97	MSS 103 06-24-97	82013A 06-24-97	06-24-97	
36	(SHT 31) BELLOWS ON LH2 RECIRC LINE (LOWER) REMOVE BURST DISC PROTECTIVE TOOL COVER - FLAG NOTE 7		82273A 06-24-97	MSS 103 06-24-97	82013A 06-24-97	06-24-9	
57	(SHTS 33 AND 34) LH2 UMBILICAL C/T PURGE VENT OUTLET - FLAG NOTE 7		82273A 06-24-97	MSS 103 06-24-97			
58	(SHTS 33 AND 34) LO2 UMBILICAL C/T PURGE VENT OUTLET - FLAG NOTE 7		82273A 06-24-97	MSS 103 06-24-97			

BUYOFF	WORK CTR	STEP	OPERATIONS

ACCOUNTABILITY OF NON-FLIGHT STREAMERS MUST BE MAINTAINED:

1) Q.C. SUPERVISION SHALL CONSECUTIVELY ISSUE STREAMERS BY SERIAL NUMBER (STARTING WITH S/N 1), AT THE ACTUAL TIME OF INSTALLATION AND S/N'S ISSUED SHALL NOT EXCEE THE NUMBER OF STREAMERS REQUIRED BY THIS PLAN (REFER TO TEMP INSTL RECORD).

2) IF STREAMERS ARE LOST OR DESTROYED, RECORD S/N ON TEMPORARY INSTALLATION RECORD.

3) ALL UNUSED STREAMERS ARE TO BE SUBMITTED TO QUALITY CONTROL DATA CENTER WITH THIS LOG TO BECOME PART OF VEHICLE DATA PACK.

USE THE FOLLOWING METHOD(S) FOR ATTACHING STREAMERS:

A) USE .060 WIRE (T1-17065)) AND NICROPRESS SLEEVES (T1-17007).

B) TAPE STREAMER TO COVERING (ALL AROUND EDGES OF STREAMERS) USING J414A TAPE (USE MMSJ476C TAPE ON TPS SURFACES). TAPE IN SUCH A MANNER AS TO ALLOW ALL STREAMER DATA TO BE VISIBLE, IF POSSIBLE. AT A MINIMUM, STREAMER SERIAL NUMBER MUST SHOW.

C) USE LACING CORD TO ATTACH STREAMERS

NOTE METHOD "A" & "C" ARE THE PRIMARY METHODS OF INSTALLIN STREAMERS. ONLY USE METHOD "B" IF THERE IS NO PROVISIONS FOR ATTACHING WIRE ROPE.

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
81186A			DWG SHTS 9-14, 36-37, 40-42; NOTE 42
------ SHOP JUN 24 '97	COEM	0035	ATTACH GFP NON-FLIGHT STREAMERS TO TEMP INSTALLED ITEMS NOTED ON TEMPORARY INSTALLATION RECORD. TO PREVENT STREAMER DAMAGE TO TPS SURFACES, SECURE ALL EXTERIOR RED STREAMERS WITH CLEAR PLASTIC (MMC00100106) OVER THE TOP, LEAVING ALL STREAMER INFORMATION VISIBLE, IF POSSIBLE. AT A MINIMUM, STREAMER SERIAL NUMBER MUST SHOW. TAPE PLASTIC EDGES DOWN USING DUCT TAPE (J476C) ON TPS SURFACES AND BLACK TAPE (J414A) ON METAL SURFACES. THE USE OF PLASTIC OVER STREAMERS IS OPTIONAL. REF DWG SHEETS 9, 10, 36 AND 37 FOR ITEM LOCATIONS ON ET.
MSS 115 6/24/97			TEMPORARY INSTALLATION RECORD FOLLOWS
------ QCBC	QC20	0036	INSPECT TO ENSURE INSTALLATION OF STREAMERS ARE COMPLETE. ATTACH ALL EXTRA STREAMERS TO THIS LOG TO BE RETURNED TO THE QUALITY DATA CENTER.

LESS 6/24/97 EXTRA STREAMERS TO BOOK

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS					
STREAMER SERIAL NO.		PART NUMBER/ NOMENCLATURE	INSTALLED (MAF) MFG	INSTALLED (MAF) INSP	REMOVED (KSC) MFG	REMOVED (KSC) INSP	PRIOR TO
ET-89 002		GH2 PRESS LINE OPENING ITEM 13	82837A JUN 19 '97	MSS 273 JUN 19 '97			
			TANK LOCATION: STA 1068, 32.5 DEGREES ATT. METH. - B				
ET-89 001		LO2 FEEDLINE OPENING ITEM 14	82837A JUN 19 '97	MSS 273 JUN 19 '97			
			TANK LOCATION: STA 1038, 23.1 DEGREES ATT. METH. - B				
ET-89 003		LH2 FEEDLINE BELLOWS & BURST DISC ITEM 33	82273A 06-24-97	MSS 103 06-24-97			
			TANK LOCATION: STA 2080, -Y SIDE ATT. METH. - B				
ET-89 007		LH2 RECIRC LINE BELLOWS ITEM 35	82273A 06-24-97	MSS 103 06-24-97			
			TANK LOCATION: STA 2093, -Y SIDE UPPER ATT. METH. - B				
ET-89 006		LH2 RECIRC LINE BELLOWS ITEM 36	82273A 06-24-97	MSS 103 06-24-97			
			TANK LOCATION: STA 2093, -Y SIDE LOWER ATT. METH. - B				
ET-89 005		LH2 UMBILICAL C/T PURGE VENT OUTLET ITEM 57	82273A 06-24-97	MSS 103 06-24-97			
			TANK LOCATION: STA 2080, -Y SIDE ATT. METH. - B				
ET-89 004		LO2 UMBILICAL C/T PURGE VENT OUTLET ITEM 58	82273A 06-24-97	MSS 103 06-24-97			
			TANK LOCATION: STA 2080, +Y SIDE ATT. METH. - B				

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
81186A ------ SHOP JUN 24 '97	COEM	0040	DWG SHTS 9 THRU 44; FLAG NOTE 21 AND DWG NOTE 57 VERIFY/REMOVE SHIPPING PROTECTION FROM FOLLOWING ITEMS PRIOR TO SHIPMENT OF ET TO KSC. REF DWG SHEETS 9, 10 AND 36 FOR ITEM LOCATIONS ON ET. INCREMENTAL BUYOFFS FOLLOW
MSS 132 ------ QCBC JUN 24 '97	QC20	0041	INSPECT TO ENSURE SHIPPING PROTECTION REMOVED FROM ITEMS LISTED BELOW. VERIFY INCREMENTAL BUYOFFS ARE COMPLETE.

ITEM	DESCRIPTION	REMOVED SHOP	(MAF) QC
	NOSE CONE		
23	(SHT 21) GO2 PRESSLINE BELLOWS (NOSE CONE)	82837A MAY 28 '97	MSS 111 MAY 28 '97
24	(SHT 21) GO2 PRESSLINE BELLOWS (NOSE CONE)	82837A MAY 28 '97	MSS 111 MAY 28 '97
25	(SHT 21) GO2 PRESSLINE BELLOWS (NOSE CONE)	82837A MAY 28 '97	MSS 111 MAY 28 '97
CS	(SHT 44) PROTECTIVE COVER ON NOSE CONE COMPARTMENT GAS TEMP NO 2 - FLAG NOTE 21	81186A JUN 6 '97	MSS 108 JUN 6 '97
CT	(SHT 44) PROTECTIVE COVER ON NOSE CONE COMPARTMENT GAS TEMP NO 1 - FLAG NOTE 21	81186A JUN 6 '97	MSS 108 JUN 6 '97
	INTERTANK COMPARTMENT		
30	(SHT 32) GH2 PRESS LINE BELLOWS (I/T COMPARTMENT)	82273A 06-04-97	MSS 273 06-04-97
31	(SHT 32) GH2 PRESS LINE BELLOWS (I/T COMPARTMENT)	82273A 06-04-97	MSS 273 06-04-97
32	(SHT 32) GH2 PRESS LINE BELLOWS (I/T COMPARTMENT)	82273A 06-04-97	MSS 273 06-04-97
37	(SHT 32) GH2 PRESS LINE BELLOWS (I/T COMPARTMENT)	82273A 06-04-97	MSS 273 06-04-97
38	(SHT 32) GH2 PRESS LINE BELLOWS (I/T COMPARTMENT)	82273A 06-04-97	MSS 273 06-04-97

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS

ITEM	DESCRIPTION	REMOVED SHOP	(MAF) QC
	VERIFY/INSPECT ITEMS REMOVED:		
BE1	(SHT 59) 14175-2751 LO2 FEEDLINE BELLOWS COVER (I/T COMPARTMENT)	06-24-97 83767A 06-04-97	6-13-97 MSS 273 06-13-97
BE2	(SHT 59) 14175-2751 LO2 FEEDLINE BELLOWS COVER (I/T COMPARTMENT)	82273A 06-04-97	MSS 273 06-04-97
CP	(SHT 45) PROTECTIVE COVER FOR PD7400095-149 OR PD7400244-029 I/T COMPARTMENT GAS TEMP NO 1	82273A 06-13-97	MSS 273 06-13-97
CR	(SHT 45) PROTECTIVE COVER FOR PD7400095-149 OR PD7400244-029 I/T COMPARTMENT GAS TEMP NO 2	82273A 06-13-97	MSS 273 06-13-97
CZ	(SHT 59) P78-3102-5-101 GH2 VENT LINE BELLOWS COVER (I/T COMPARTMENT)	82273A 06-13-97	MSS 273 06-13-97
DA	(SHT 59) P78-3102-5-102 GH2 VENT LINE BELLOWS COVER (I/T COMPARTMENT)	82273A 06-13-97	MSS 273 06-13-97

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW

PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS	REMOVED SHOP	(MAF) QC
ITEM			DESCRIPTION		
			INTERTANK, EXTERNAL		
68		(SHT 19)	RSS ANTENNA ASSY STA 892.26 AT +Z -Y AXIS	JUN 13 '97 82837A	MSS 215
69		(SHT 19)	RSS ANTENNA ASSY STA 892.26 AT -Z +Y AXIS	82837A JUN 13 '97	MSS 215
5		(SHT 20)	FLEX JOINT ON GO2 PRESS LINE FWD STA 922	82837A JUN 13 '97	MSS 215
6		(SHT 20)	SLIDE JOINT ON GO2 PRESS LINE STA 922 - 950	82837A JUN 13 '97	MSS 215
7		(SHT 20)	FLEX JOINT ON GO2 PRESS LINE STA 960	82837A JUN 13 '97	MSS 215
20		(SHT 28)	BELLOWS ON LO2 FEEDLINE FWD OF STA 1129.9	82837A JUN 13 '97	MSS 215
			STATION 2058 & AFT ORB HDWR		
39		(SHT 33)	GH2 PRESS LINE BELLOWS (APPROX STA 2058 -Y SIDE)	82837A JUN 19 '97	MSS 273 JUN 19 '97
40		(SHT 33)	GH2 PRESS LINE BELLOWS (APPROX STA 2058 -Y SIDE)	81186A JUN 24 '97	MSS 132 JUN 24 '97
41		(SHT 33)	GH2 PRESS LINE BELLOWS (APPROX STA 2058 -Y SIDE)	81186A JUN 24 '97	MSS 132 JUN 24 '97
28		(SHT 35A)	GH2 PRESS LINE BELLOWS (APPROX STA 2058 +Y SIDE)	82837A JUN 19 '97	MSS 273 JUN 19
29		(SHT 35A)	GH2 PRESS LINE BELLOWS (APPROX STA 2058 +Y SIDE)	82837A	MSS 273 JUN 19 '97
63		(SHT 35A)	GH2 PRESS LINE BELLOWS (APPROX STA 2058 +Y SIDE)	82837A	MSS 273 JUN 19 '97
44		(SHT 35)	GO2 PRESS LINE BELLOWS (APPROX STA 2058 +Y SIDE)	82837A JUN 19 '97	MSS 273 JUN 19 '97
45		(SHT 35)	GO2 PRESS LINE BELLOWS (APPROX STA 2058 +Y SIDE)	82837A JUN 19 '97	MSS 273 JUN 19 '97
46		(SHT 35)	GO2 PRESS LINE BELLOWS (APPROX STA 2058 +Y SIDE)	82837A JUN 19 '97	MSS JUN 19 '97

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

OPERATIONS SHEET

BUYOFF	WORK CTR	STEP	OPERATIONS
MSS 215 6-13-97 ------ QCBC	QC20	0042	DWG SHT 6, NOTE 67 VERIFY PRESSURE STABILIZATION CHECK HAS BEEN COMPLETED ANI IS ACCEPTABLE PER TEST PROCEDURE TP-8C102-AT (6.0 +/-0.5 PSIG AFTER STABLE FOR 24 HRS).
82837A 6/19/97 ------ SHOP	COEM	0045	REMOVE T29K2520 PROTECTIVE TOOL AT STA 371.
82837A JUN 20 '97 N/A ------ SHOP	COEM	0050	N/A STEP IF P78-3156 BREATHER IS INSTALLED. REMOVE P78-3101 BREATHER SET. (SEE P78-3101 FIGURE 1 AND FIGURE 2) (P78-3101 6.1) FORWARD REMOVED P78-3101 BREATHER SET TO PRODUCTION CONTRC
82837A JUN 20 '97 SHOP	COEM	0055	N/A STEP IF P78-3101 BREATHER IS INSTALLED. REMOVE P78-3156-1-101 BREATHER SET. (SEE P78-3101 FIGURE 1 AND FIGURE 2) (P78-3101 6.1) FORWARD REMOVED P78-3156 BREATHER SET TO PRODUCTION CONTRO
MSS 273 JUN 20 '97 ------ QCBC	QC20	0056	INSPECT TO ENSURE THAT THE P78-3101/3156 BREATHER SET IS REMOVED FROM TRANSPORTER.

MANUFACTURING PROCESS PLAN

PLNG. CHG. LEVEL: NEW PART NUMBER: 80900000041-OP110

COPICS ROUTING SUMMARY SHEET
OPERATIONS FOR CLOCKING

OPER NO.	SU	T Y	WORK CENTER	SETUP TIME	RUN TIME	MANP TIME	U	OPERATION DESCRIPTION	T S	OE	O K	OB	FS	S K	IO PRP
0001		S	PICK		.20	.20	1	PICK PARTS	1						
0002		S	SCC5		1.00	1.00	1	STAGE PARTS	1						8
0005		S	COEM		104.0	43.02	1	PROT COVERS/STRMR	2		2	2			152
0021		I	QC20		35.88	14.84	1	Q-PROT COVERS/STR	2						

NOTES ON LABOR CLOCKING

If you are working to the specified step in this MPP that corresponds to your OCC/Work Center, you will clock labor to the operation number (pay step) that most closely precedes your step by numeric value.

ET-89 (LWT-82)

STREAMER ACCOUNTABILITY

INSTALLED

ET-089-001
THRU
ET-089-007

RETURNED

ET-089-008
THRU
ET-089-020