

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- CIL HARDWARE
 NUMBER: 06-1B-0631 -X

SUBSYSTEM NAME: ARS - COOLING

REVISION: 1 01/08/98

 PART DATA

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
	: ARS DUCT	
LRU	: COUPLING, SLEEVE, FLEXIBLE	ME276-0024
LRU	: COUPLING, SLEEVE, FLEXIBLE	ME276-0026
LRU	: DUCT, FLEXIBLE	ME276-0028
LRU	: DUCT, FLEXIBLE	ME276-0037
LRU	: DUCT	V070-613115
LRU	: DUCT	V070-613116
LRU	: DUCT	V070-613117
LRU	: DUCT	V070-613118
LRU	: DUCT	V070-613119
LRU	: DUCT	V070-613430
LRU	: DUCT	V070-613432
LRU	: DUCT	V070-613492
LRU	: DUCT	V070-613520
LRU	: DUCT	V070-613609
LRU	: DUCT	V070-613614
LRU	: DUCT	V070-613615
LRU	: DUCT	V070-613617
LRU	: DUCT	V070-613618
LRU	: DUCT	V070-613621

**FAILURE MODES EFFECTS ANALYSIS (FMEA) --CIL HARDWARE
NUMBER: 06-1B-0631 -X**

LRU	: DUCT	V070-613677
LRU	: DUCT	V070-613678
LRU	: DUCT	V070-613688
LRU	: DUCT	V070-613693
LRU	: DUCT	V070-613694
LRU	: DUCT	V070-613695
LRU	: DUCT	V070-613696
LRU	: DUCT	V070-613761
LRU	: DUCT	V070-613778
LRU	: DUCT	V070-613784
LRU	: DUCT	V070-613785
LRU	: DUCT	V070-613786
LRU	: DUCT	V070-613792
LRU	: DUCT	V070-613799
LRU	: DUCT	V070-613801
LRU	: DUCT	V070-613802
LRU	: DUCT	V070-613810
LRU	: DUCT	V070-613823
LRU	: DUCT	V070-613875

**EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
DUCT SECTIONS, CABIN RETURN AND SUPPLY AIR.**

REFERENCE DESIGNATORS:

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NUMBER: 06-1B-0631 -X

QUANTITY OF LIKE ITEMS:
ONE SET PER VEHICLE

FUNCTION:

PRE-MEDS:

(THIS IS A COLLECTOR FMEA WHICH COMBINES SEPARATE FMEA'S WRITTEN WITH THE INTENT OF SUBDIVIDING ARS DUCTS INTO FUNCTIONAL GROUPS).

1. PROVIDE MANIFOLDING OF FLIGHT DECK RETURN AIR TO THE THREE PARALLEL DUCTS LEADING DOWN THE STARBOARD WALL OF THE MID-DECK TO THE CABIN FAN INLET PLENUM. P/N'S: V070-613693, 694, 695, 696.
2. PROVIDE COMMON RETURN AIR FLOW PATH FOR FLIGHT DECK EQUIPMENT: VSU, AVV12, DDU3, RCU, MSS, DU4, DEU4, AM12, PPO2-A,B,C, HUMIDITY, CABIN TEMP CONTROL SENSORS AND CABIN TEMP MONITOR SENSOR. P/N'S V070-613783, 799, 810.
3. PROVIDE CONNECTIONS BETWEEN 3 MAIN RETURN DUCTS AND CABIN FAN, CO2 ABSORBER AND TEMP CONTROLLER ASSY, AND HUMIDITY CONTROL HEAT EXCHANGER. P/N'S V070-613492, 677, 678, 688; ME276-0024 & -0026.
4. PROVIDE RETURN AIR FLOW PATH FROM THE DISPLAY ELECTRONICS UNITS (DEU'S) TO THE MAIN BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613520, ME276-0024, -0037.
5. PROVIDES RETURN AIR FLOW PATH FROM THE REMOTE CONTROL UNIT (RCU) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0028.
6. PROVIDE RETURN AIR FLOW PATH FROM DISPLAY UNIT DU1, DU2, DU3, TO THE MAIN BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613778, 784, 785, ME276-0037.
7. PROVIDES RETURN AIR FLOW PATH FROM THE MANIPULATOR CONTROL INTERFACE UNIT (MCIU) TO THE COMMON RETURN DUCT. P/N'S V070-613823, ME276-0028.
8. PROVIDE RETURN AIR FLOW PATH FROM DISPLAY DRIVER UNITS (DDU1, DDU2) TO THE COLLECTION BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613788, ME276-0024.
9. PROVIDES SUPPLY AIR FLOW PATH FROM THE OUTLET OF THE HUMIDITY CONTROL HEAT EXCHANGER UP THROUGH THE MID-DECK TO THE FLIGHT DECK DISTRIBUTION DUCTS FOR THE COMMANDER, PILOT, AFT FLIGHT DECK, AND SLEEP STATIONS. P/N'S V070-613115, 116, 117, 118, 119, 430, 432, 609, 614, 615, 617, 618, 621, 761.
10. PROVIDE RETURN AIR FLOW PATH FROM THE CABIN HUMIDITY AND PPO2-C SENSOR HOUSING TO THE COMMON RETURN DUCT. P/N'S V070-613799, 875.
11. PROVIDE RETURN AIR FLOW PATH FROM THE ALPHA MACH INDICATORS (AMI'S) TO THE MAIN BRANCH OF THE RETURN AIR DUCT. P/N ME276-0024.
12. PROVIDE RETURN AIR FLOW PATH FROM THE THREE CABIN TEMPERATURE SENSORS AND THE PPO2-A,B SENSORS. P/N'S V070-613799, 875.
13. PROVIDE RETURN AIR FLOW PATH FROM THE ALTITUDE VERTICAL VELOCITY INDICATORS (AVV1'S) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0037.

FAILURE MODES EFFECTS ANALYSIS (FMEA) --CIL HARDWARE

NUMBER: 06-1B-0631 -X

14. PROVIDE RETURN AIR FLOW PATH FROM TWO TELEVISION MONITORS (TV) TO THE COMMON RETURN DUCT. P/N V070-613792, ME276-0037.
15. PROVIDE RETURN AIR FLOW PATH FROM THE MISSION SPECIALIST STATION (MSS) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0037.
16. PROVIDE RETURN AIR FLOW PATH FROM THE VIDEO SWITCHING UNIT (VSU) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0028.
17. PROVIDE RETURN AIR FLOW PATH FROM PAYLOAD TO THE COMMON RETURN DUCT. P/N V070-613801, 802

MEDS CONFIGURATION:

(THIS IS A COLLECTOR FMEA WHICH COMBINES SEPARATE FMEA'S WRITTEN WITH THE INTENT OF SUBDIVIDING ARS DUCTS INTO FUNCTIONAL GROUPS).

1. PROVIDE MANIFOLDING OF FLIGHT DECK RETURN AIR TO THE THREE PARALLEL DUCTS LEADING DOWN THE STARBOARD WALL OF THE MID-DECK TO THE CABIN FAN INLET PLENUM. P/N'S: V070-613693, 694, 695, 696.
2. PROVIDE COMMON RETURN AIR FLOW PATH FOR FLIGHT DECK EQUIPMENT: VSU, DDU3, RCU, MSS, PPO2-A,B,C, HUMIDITY, CABIN TEMP CONTROL SENSORS AND CABIN TEMP MONITOR SENSOR. P/N'S V070-613783, 799.
3. PROVIDE CONNECTIONS BETWEEN 3 MAIN RETURN DUCTS AND CABIN FAN, CO2 ABSORBER AND TEMP CONTROLLER ASSY, AND HUMIDITY CONTROL HEAT EXCHANGER. P/N'S V070-613492, 677, 678, 688; ME276-0024 & -0026.
4. PROVIDE RETURN AIR FLOW PATH FROM THE INTEGRATED DISPLAY PROCESSOR (IDP'S) TO THE MAIN BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613520, ME276-0024, -0037.
5. PROVIDES RETURN AIR FLOW PATH FROM THE REMOTE CONTROL UNIT (RCU) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0028.
6. PROVIDES RETURN AIR FLOW PATH FROM THE MANIPULATOR CONTROL INTERFACE UNIT (MCIU) TO THE COMMON RETURN DUCT. P/N'S V070-613823, ME276-0028.
7. PROVIDE RETURN AIR FLOW PATH FROM DISPLAY DRIVER UNITS (DDU1, DDU2) TO THE COLLECTION BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613785, ME276-0024.
8. PROVIDES SUPPLY AIR FLOW PATH FROM THE OUTLET OF THE HUMIDITY CONTROL HEAT EXCHANGER UP THROUGH THE MID-DECK TO THE FLIGHT DECK DISTRIBUTION DUCTS FOR THE COMMANDER, PILOT, AFT FLIGHT DECK, AND SLEEP STATIONS. P/N'S V070-613115, 116, 117, 118, 119, 430, 432, 608, 614, 615, 617, 618, 621, 761.
9. PROVIDE RETURN AIR FLOW PATH FROM THE CABIN HUMIDITY AND PPO2-C SENSOR HOUSING TO THE COMMON RETURN DUCT. P/N'S V070-613799, 875.
10. PROVIDE RETURN AIR FLOW PATH FROM THE THREE CABIN TEMPERATURE SENSORS AND THE PPO2-A,B SENSORS. P/N'S V070-613799, 875.
11. PROVIDE RETURN AIR FLOW PATH FROM TWO TELEVISION MONITORS (TV) TO THE COMMON RETURN DUCT. P/N V070-613792, ME276-0037.
12. PROVIDE RETURN AIR FLOW PATH FROM THE MISSION SPECIALIST STATION (MSS) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0037.
13. PROVIDE RETURN AIR FLOW PATH FROM THE VIDEO SWITCHING UNIT (VSU) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0028.
14. PROVIDE RETURN AIR FLOW PATH FROM PAYLOAD TO THE COMMON RETURN DUCT. P/N V070-613801, 802

FAILURE MODES EFFECTS ANALYSIS (FMEA) --CIL HARDWARE
NUMBER: 06-1B-0631 -X

- 15. PROVIDE RETURN AIR FLOW PATH FROM MULTIFUNCTION DISPLAY UNITS TO THE MAIN BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613778, 784, 785, ME276-0037.
- 16. PROVIDE SUPPLY AIR FLOW PATH TO MULTIFUNCTION DISPLAY UNIT (AFD1). P/N'S V070-613XXX.

- APPROVALS -

SS&PAE MANAGER	: P. STENGER-NGUYEN	: <i>P. Stenger-Nguyen</i>
SS&PAE	: T. AI	: <i>T. Ai</i>
DESIGN ENGINEERING	: K. DUONG	: <i>K. Duong</i>
MEDS SYSTEM	: M. B. WARNER	: <i>M. B. Warner</i>
MEDS HARDWARE	: R. SITAPARA	: <i>R. Sitapara</i>
JSC MOD	:	: <i>Approved by [Signature] 2/23/98</i>

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -06J1 -1 REV:08/22/82

ASSEMBLY : AIR DUCTS
P/N RI : V070-613XXX CRIT. FUNC: 2
P/N RI : ME276-0024, 26, 28, 37 CRIT. HDW: 2
P/N VENDOR: VEHICLE 102 103 104
EFFECTIVITY: X X X
QUANTITY : 1 SET PER VEHICLE PHASE(S): PL LO X OO X DO X LS

PREPARED BY: DES N. K. DUONG
REL N. L. STEISSLINGER
QE W. J. SMITH

REDUNDANT SCREEN
APPROVED BY: *[Signature]*
W/DES
REL
QE

A- APPROVED BY (NASA)
SSM
REL
QE

ITEM:
DUCT SECTIONS, CABIN RETURN AND SUPPLY AIR

FUNCTION:

- (THIS IS A COLLECTOR FMEA WHICH COMBINES SEPARATE FMEA'S WRITTEN WITH THE INTENT OF SUBDIVIDING AIR DUCTS INTO FUNCTIONAL GROUPS).
1. PROVIDE MANIFOLDING OF FLIGHT DECK RETURN AIR TO THE THREE PARALLEL DUCTS LEADING DOWN THE STARBOARD WALL OF THE MIDDECK TO THE CABIN FAN INLET PLENUM. P/N'S: V070-613693, 694, 695, 696.
 2. PROVIDE COMMON RETURN AIR FLOW PATH FOR FLIGHT DECK EQUIPMENT: VSCU, AVV12, DDU1, RCU, MSS, DU4, DEU4, AMI2, PPO2-A,B,C, HUMIDITY, CABIN TEMP CONTROL SENSORS AND CABIN TEMP MONITOR SENSOR. P/N'S V070-613781, 799.
 3. PROVIDE CONNECTIONS BETWEEN 3 MAIN RETURN DUCTS AND CABIN FAN, CO2 ABSORBER AND TEMP CONTROLLER ASSY, AND HUMIDITY CONTROL HEAT EXCHANGER. P/N'S V070-613492, 677, 688; ME276-0024 & -0026.
 4. PROVIDE RETURN AIR FLOW PATH FROM THE DISPLAY ELECTRONICS UNITS (DEU'S) TO THE MAIN BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613520, ME276-0024, -0037.
 5. PROVIDES RETURN AIR FLOW PATH FROM THE REMOTE CONTROL UNIT (RCU) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0028.
 6. PROVIDE RETURN AIR FLOW PATH FROM DISPLAY UNIT DU1, DU2, DU3, TO THE MAIN BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613778, 784, 785, ME276-0037.
 7. PROVIDES RETURN AIR FLOW PATH FROM THE MANIPULATOR CONTROL INTERFACE UNIT (MCIU) TO THE COMMON RETURN DUCT. P/N'S V070-613823, ME276-0028.
 8. PROVIDE RETURN AIR FLOW PATH FROM DISPLAY DRIVER UNITS (DDU1, DDU2) TO THE COLLECTION BRANCH OF THE RETURN AIR DUCT. P/N'S V070-613786, ME276-0024.
 9. PROVIDES SUPPLY AIR FLOW PATH FROM THE OUTLET OF THE HUMIDITY CONTROL HEAT EXCHANGER UP THROUGH THE MIDDECK TO THE FLIGHT DECK DISTRIBUTION DUCTS FOR THE COMMANDER, PILOT, AFT FLIGHT DECK, AND SLEEP STATIONS. P/N'S V070-613115, 116, 117, 118, 119, 430, 432, 609, 614, 615, 617, 618, 621, 761.
 10. PROVIDE RETURN AIR FLOW PATH FROM THE CABIN HUMIDITY AND PPO2-C SENSOR HOUSING TO THE COMMON RETURN DUCT. P/N'S V070-613799, 875.
 11. PROVIDE RETURN AIR FLOW PATH FROM THE ALPHA MACH INDICATORS (AMI'S) TO THE MAIN BRANCH OF THE RETURN AIR DUCT. P/N ME276-0024.
 12. PROVIDE RETURN AIR FLOW PATH FROM THE THREE CABIN TEMPERATURE SENSORS AND THE PPO2-A,B SENSORS. P/N'S V070-613799, 875.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -06J1 -1 REV:08/22/86

13. PROVIDE RETURN AIR FLOW PATH FROM THE ALTITUDE VERTICAL VELOCITY INDICATORS (AVVI'S) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0037.
14. PROVIDE RETURN AIR FLOW PATH FROM TWO TELEVISION MONITORS (TV) TO THE COMMON RETURN DUCT. P/N'S V070-613792, ME276-0037.
15. PROVIDE RETURN AIR FLOW PATH FROM THE MISSION SPECIALIST STATION (MSS) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0037.
16. PROVIDE RETURN AIR FLOW PATH FROM THE VIDEO SWITCHING UNIT (VSU) TO THE COLLECTION BRANCH RETURN DUCT. P/N ME276-0028.
17. PROVIDE RETURN AIR FLOW PATH FROM PAYLOAD TO THE COMMON RETURN DUCT. P/N V070-613801, 802.

FAILURE MODE:
RESTRICTED FLOW

CAUSE(S):
PHYSICAL DAMAGE, DEBRIS/CONTAMINATION

EFFECT(S) ON:
(A) SUBSYSTEM (B) INTERFACES (C) MISSION (D) CREW/VEHICLE

(A) INCREASED FLOW RESISTANCE AND REDISTRIBUTION OF AIR FLOW.

(B) REDUCTION OF AIR FLOW THROUGH AFFECTED AVIONICS LRU'S AND SENSORS. INCREASED TEMPERATURE OF AFFECTED LRU'S.

(C) POSSIBLE EARLY MISSION TERMINATION BASED UPON LOCATION AND MAGNITUDE OF RESTRICTION AND ITS EFFECT ON LRU'S BEING COOLED.

(D) NO EFFECT. EARLY MISSION TERMINATION WILL PRECLUDE LOSS OF CREW/VEHICLE.

DISPOSITION & RATIONALE:
(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A) DESIGN
THE COLLECTION RETURN AND DISTRIBUTION SUPPLY DUCTS ARE RIGID EPOXY/ARAMID SECTIONS NOMINALLY ABOUT 15 INCHES LONG AND PREFORMED TO FIT THE CONTOUR OF THE VEHICLE AT THE INSTALLATION SITE. SECTIONS ARE HARD MOUNTED TO STRUCTURE BY A BRACKET/BAND CLAMP ASSEMBLY. A 0.50 INCH STRESS RELIEF GAP IS PROVIDED BETWEEN DUCT SECTIONS. THIS GAP IS BRIDGED BY FLEXIBLE SILICONE/FIBERGLASS SLEEVES HELD IN PLACE BY BAND CLAMPS AND GROOVES THAT ARE PREFORMED INTO EACH DUCT SEGMENT. DUCT BRANCHES LEADING TO AVIONICS BOXES ARE PREFORMED INTO THE MAIN DUCT SECTIONS OR MOUNTED TO THE MAIN DUCTS VIA PREFORMED INTERFACE FITTINGS. DUCTS ARE PROTECTED FROM DAMAGE BY CLOSEOUT PANELS.

FLEXIBLE DUCTS OF SILICONE/FIBERGLASS FABRIC OVER STEEL HELICAL SPRING WIRE ARE USED AS REQUIRED AT THE DUCT/AVIONICS BOX INTERFACE. BAND CLAMPS ARE USED TO HOLD FLEXIBLE DUCTS TO LRU AND RIGID DUCT INTERFACES. DUCTS ARE PROTECTED FROM DAMAGE BY CLOSEOUT PANELS. ALL AIR ENTERING THE RETURN DUCT SYSTEM IS FILTERED BY SOME OF THE AVIONICS LRU FILTERS AND THE WCS RETURN FILTER. IN ADDITION, THERE IS A FINER MESH (40/70 MICRON) FILTER AT THE INLET TO THE FAN PACKAGE WHICH

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -0631 -1 REV:08/22/85

FILTERS THE CABIN AIR AS IT CIRCULATES THROUGH THE FAN.

(B) TEST

RIGID DUCTS:

QUALIFICATION TEST - TESTS OF SIMILAR MATERIAL SHOW THAT RIGID EPOXY/ARAMID DUCTS ARE UNAFFECTED BY HUMIDITY AND TEMPERATURE WITHIN THE LIMITS IMPOSED BY THE CABIN ATMOSPHERE. TENSILE STRENGTH (500 KSI) REMAINED UNCHANGED AFTER EXPOSURE TO 100 PHM OZONE AT 70 F FOR 1000 HOURS. TOLERANCE TO SALINITY WAS DEMONSTRATED BY ANALYSIS BASED ON TESTS OF SIMILAR MATERIAL IN SALT WATER FOR 125 DAYS. TRANSIENT VIBRATIONS, RANDOM VIBRATIONS, AND CRASH LOADS WERE CERTIFIED BY ANALYSIS.

FLEXIBLE DUCTS:

QUALIFICATION TEST - THE SILICONE/FIBERGLASS FLEX DUCTS WERE SHOWN TO WITHSTAND TEMPERATURES FROM -60 F TO 600 F WITHOUT PROBLEMS. NON-NUTRIENT TO FUNGUS DEMONSTRATED BY TEST. SALINITY TOLERANCE DEMONSTRATED BY TEST OF IDENTICAL MATERIAL EXPOSED TO A 20% SALT SOLUTION AT 95 F AND 85% RELATIVE HUMIDITY FOR 50 HOURS WITH NO EFFECT. BURST PRESSURE DEMONSTRATED BY TEST TO BE GREATER THAN 200 PSIG. TRANSIENT AND RANDOM VIBRATIONS WERE CERTIFIED BY TEST OF THE SIMILAR DUCTS AND CRASH LOADS BY ANALYSIS.

ACCEPTANCE TEST - EXTERNAL LEAK TEST AT 0.5 PSIG FOR 5 MINUTES. MAX LEAKAGE 0.005 CFM/INCH DIAMETER/FT LENGTH. PROOF TEST AT 1.0 PSIG FOR 5 MINUTES.

IN-VEHICLE TESTING - SUPPLY AIR FLOW DISTRIBUTION IS MEASURED USING A HOT WIRE ANEMOMETER AT COMPLETION OF ASSEMBLY OF EACH VEHICLE. CABIN FAN DELTA-P IS MONITORED DURING THIS TEST AND THE DELTA-P CAN BE USED AS A REFERENCE POINT TO DETECT MAJOR FLOW RESISTANCE CHANGES IN THE DUCT SYSTEM. DUCT INSTALLATION IS INSPECTED FOR DAMAGE PRIOR TO INSTALLATION OF CLOSEOUT PANELS.

OMPSD - CABIN FAN DELTA-P IS MONITORED DURING EVERY TURNAROUND AND SERVES AS AN INDICATION OF SYSTEM PERFORMANCE.

FLEXIBLE AND HARD DUCTS ARE BEING COMPLETELY INSPECTED PRIOR TO FIRST REFLIGHT OF EACH ORBITER AND ARE ALSO INSPECTED AS AVAILABLE IN CONJUNCTION WITH REMOVAL OF PANELS/LRU'S. DUCTS ARE ALSO INSPECTED DURING PERIODIC ZONAL INSPECTIONS. SUPPLY DUCT FLOW RATES ARE TESTED AS A CONTINGENCY UPON LRU REPLACEMENT.

(C) INSPECTION

RECEIVING INSPECTION

RAW MATERIAL AND PROCESS CERTIFICATIONS VERIFIED BY INSPECTION.

ASSEMBLY/INSTALLATION

INSPECTION VERIFIES THE FOLLOWING: PROCESS REQUIREMENTS RELATIVE TO MATERIALS PREPARATION, FABRICATION OF DUCT SECTIONS (INCLUDING DUCT LENGTH AND WALL THICKNESS) AND CURE CYCLES IN ACCORDANCE WITH REQUIREMENTS, INSTALLATION OF CURED SECTIONS INTO THE DUCT SYSTEM (BONDING, SPLICING, SEAL COATING, INSTALLATION OF CLAMPS, FASTENERS, TAPE AND INSULATION) IN ACCORDANCE WITH DRAWING AND SPECIFICATION REQUIREMENTS.

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : ATMOSPHERIC REVIT. FMEA NO 06-1B -0631 -1 REV:08/22/83

CONTAMINATION CONTROL
CLEANLINESS REQUIREMENTS TO THE GENERALLY CLEAN (GC) LEVEL.

CRITICAL PROCESSES
CURING IS VERIFIED BY INSPECTION.

TESTING
THE ATP, WHICH INCLUDES LEAK AND PROOF TESTING, EXAMINATION FOR WORKMAN-
SHIP, FINISH AND DIMENSIONAL FEATURES IS VERIFIED BY INSPECTION.

PACKAGING AND HANDLING
PARTS PROTECTION AND HANDLING REQUIREMENTS ARE VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

OR ECL2010J37, 9/24/79: IN CHECKING DFI CONTAINER AIR FLOW, THE CABIN
AIR SUPPLY FLOW BALANCE INDICATED REDUCED FLOW TO THE PLT DIFFUSER. A
PLASTIC BAG WAS FOUND INSIDE THE DUCT. RETEST YIELDED ADEQUATE FLOW.
THIS PROBLEM WAS NOT A CAR; CLOSED AS A PR, WITH NO CORRECTIVE ACTION.

CAR AC2915-000, 9/13/83: DURING SUPPLY DUCT FLOW TESTS AT PALMDALE,
REDUCED FLOW WAS NOTED AT APT FLIGHT DECK DIFFUSER "A". A WHITE TAG WAS
FOUND LODGED IN THE DIFFUSER. CORRECTIVE ACTION - AN "AWARE" WAS ISSUED
TO HELP PROTECT DUCTS FROM DEBRIS. MANUFACTURING AND QUALITY AGREED TO
APPLY INSPECTION SEALS ON ALL OPEN DUCT COVERS.

CAR AC8158-000, 5/24/84: WHILE WORKING A TPS AT KSC - REMOVING CAP TO
VERIFY SUCTION LINE, A PARTS TAG (FORM 93-H) WAS FOUND TAPED INSIDE THE
LINE. ACTION WAS TRANSFERRED TO CAR AD2016-000, ON WHICH SEVERAL
OCCURRENCES OF DUCT/LINE CONTAMINATION WERE ACCUMULATED. CORRECTIVE
ACTION - DUCT INSTALLATION PLANNING WAS REVISED TO REQUIRE A BUY-OFF OF
VISUAL VERIFICATION THAT THERE IS NO DEBRIS IN DUCTS JUST PRIOR TO
CLOSEOUT.

(E) OPERATIONAL USE

1. CREW ACTION
CABIN FAN PERFORMANCE DEGRADATION TROUBLESHOOTING.
2. TRAINING
 - A. CURRENT ECLSS TRAINING COVERS THE EFFECTS OF CABIN FAN PERFORMANCE DEGRADATION.
 - B. CURRENT TRAINING INCLUDES THE GENERIC EFFECT OF LRU FAILURES.
 - C. LRU GENERIC FAILURE PROCEDURES APPEAR IN THE APPROPRIATE FDP ARTICLES.
3. OPERATIONAL CONSIDERATIONS
 - A. REAL TIME DATA SYSTEM ALLOWS FOR GROUND MONITORING.
 - B. IFM REPAIR/REMOVAL WOULD BE CONSIDERED DEPENDING ON LOCATION OF BLOCKAGE.