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PRINT DATE: 01/09/90

SHUTTLE CRITICAL ITEMS LIST - ORBITER NUMBER: 06-1C/0135-X

SUBSYSTEM NAME: ARS - ARPCS

REVISION : 2 01/09/90

	PART NAME VENDOR NAME	PART NUMBER VENDOR NUMBER
LRU :	N2/O2 CONTROL PANEL CARLETON TECHNOLOGIES	MC250-0002-1001 2720-0001
SRU :	VALVE, CHECK	2662-0001-15

QUANTITY OF LIKE ITEMS: 2
ONE PER LOOP
TWO PER SUBSYSTEM

FUNCTION:
CHECK VALVE, OXYGEN SUPPLY

ALLOWS GAS FLOW IN A SINGLE DIRECTION WHICH PREVENTS NITROGEN FROM MOVING BACK INTO THE OXYGEN SYSTEM. ALLOWS FOR OXYGEN FLOW OF 75 POUNDS PER HOUR WITH A PRESSURE DROP OF LESS THAN 2 PSID.

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SHUTTLE CRITICAL ITEMS LIST - ORBITER

NUMBER: 06-1CY-0135-03

REVISION# 2 01/09/90

SUBSYSTEM: ARS - ARPCS
LRU : Y2/O2 CONTROL PANEL
ITEM NAME: VALVE, CHECK

CRITICALITY OF THIS
FAILURE MODE: 1R2

- FAILURE MODE:
EXTERNAL LEAKAGE

MISSION PHASE:

PL PRELAUNCH
LO LIFT-OFF
OO ON-ORBIT
DO DE-ORBIT
LS LANDING SAFING

- VEHICLE/PAYLOAD/KIT EFFECTIVITY: 102 COLUMBIA
: 103 DISCOVERY
: 104 ATLANTIS
: 105 ENDEAVOUR

- CAUSE:
MECHANICAL SHOCK, VIBRATION, CORROSION

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

REDUNDANCY SCREEN A) PASS
B) PASS
C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

- FAILURE EFFECTS -

(A) SUBSYSTEM:
LEAKAGE OF OXYGEN INTO CABIN UNTIL ASSOCIATED REG INLET VALVE IS CLOSED.

(B) INTERFACING SUBSYSTEM(S):
INCREASED CABIN PPO2 UNTIL REG INLET VALVE IS CLOSED.

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(C) MISSION:

POSSIBLE LOSS OF MISSION; ONLY REG INLET VALVE REMAINS TO ISOLATE LEAKAGE IN ORDER TO PRECLUDE LOSS OF EMERGENCY SYSTEM (LES).

(D) CREW, VEHICLE, AND ELEMENT(S):

NO EFFECT.

(E) FUNCTIONAL CRITICALITY EFFECTS:

GROSS LEAKAGE OF CHECK VALVE, COMBINED WITH 100 PSI REG INLET VALVE INTERNAL LEAKAGE, CAUSES LOSS OF LES SYSTEM AND POSSIBLE LOSS OF CREW/VEHICLE.

 - DISPOSITION RATIONALE -

(A) DESIGN:

VALVE BODY IS MADE OF 17-4 PH CONDITION C CRES, WHICH IS PRECIPITATION HARDENED CORROSION RESISTANT STEEL WHICH HAS A HIGH STRENGTH TO WEIGHT RATIO. CHECK VALVE HAS SILASTIC 675 SILICONE RUBBER MOLDED INTO THE 17-4 PH CONDITION A POPPET WITH THE BACK PRESSURE LOADS BEING BORNE BY METAL TO METAL CONTACT AND THE ELASTOMER FUNCTIONING AS AN UNBROKEN GAS SEAL ACROSS THE VALVE. SILASTIC 675 SILICONE RUBBER HAS GOOD RESISTANCE TO ENVIRONMENTAL EXPOSURE, FLEXING AND FATIGUE. IT ALSO HAS LOW FLAMMABILITY AND OUTGASSING. THE OZONE RESISTANCE OF SILICONE RUBBER IS EXCELLENT. INLET PORT IS PROTECTED BY A 10 MICRON FILTER. ALL OTHER STATIC SEALS ARE ALSO SILASTIC 675.

(B) TEST:

ACCEPTANCE TEST - PROOF PRESSURE 1885 PSIG, LEAK TESTED FOR 1.0 SCCM MAX LEAKAGE AT 900 PSIG.

QUALIFICATION TEST - LIFE CYCLE TESTING - 1000 CYCLES AT 875 PSIG. BURST PRESSURE IS 2500 PSIG. SUBJECTED TO THE FOLLOWING AS PART OF THE BURST PRESSURE IS 2500 PSIG. SUBJECTED TO THE FOLLOWING AS PART OF THE EMERGENCY C2 CONTROL PANEL. DESIGN SHOCK - 20G TERMINAL SAWTOOTH PULSE OF 11 MS DURATION IN EACH DIRECTION OF THREE ORTHOGONAL AXES. RANDOM VIBRATION SPECTRUM ENVELOPE - 20 TO 150 HZ INCREASING AT 6 DB/OCTAVE TO 0.03 G**2/HZ AT 150 HZ. CONSTANT AT 0.03 G**2/HZ FROM 150 TO 1000 HZ, DECREASING AT 6 DB/OCTAVE FROM 1000 TO 2000 HZ FOR 48 MINUTES PER AXIS FOR THREE ORTHOGONAL AXES. ATP TO VERIFY LEAKAGE IS PERFORMED AFTER SHOCK AND VIBRATION TESTING.

IN-VEHICLE TESTING - OVERPRESSURE AND LEAK TEST PERFORMED.

OMRSD - EXTERNAL LEAK TEST IS PERFORMED AT INTERVALS OF FIVE FLIGHTS AT 900 - 950 PSIG, 70 SCCM MAX SYSTEM LEAKAGE. INFLIGHT CHECKOUT DURING EACH MISSION VERIFIES NO EXTERNAL LEAKAGE.

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(C) INSPECTION:

RECEIVING INSPECTION
RAW MATERIAL VERIFIED BY INSPECTION FOR MATERIAL AND PROCESS
CERTIFICATION.

CONTAMINATION CONTROL

CLEANLINESS LEVEL 30CA PER MA0110-301 AND 100 ML RINSE TEST VERIFIED BY
INSPECTION. SYSTEM GAS SAMPLES ASSOCIATED WITH RESERVICING ARE
ANALYZED FOR CONTAMINATION.

ASSEMBLY/INSTALLATION

DIMENSIONAL CHECK INCLUDING MIPS FOR PERPENDICULARITY AND CONCENTRICITY
ARE PERFORMED AND VERIFIED BY INSPECTION. TIG WELD SCHEDULES VERIFIED
BY INSPECTION. VISUAL INSPECTION USING 10X MAGNIFICATION ON SEAL RING
VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

RADIOGRAPHIC AND PENETRANT INSPECTION OF WELDS VERIFIED BY INSPECTION.

CRITICAL PROCESSES

TIG WELD, PARTS PASSIVATION AND HEAT TREATMENT VERIFIED BY INSPECTION.
SOLDER CONNECTIONS VERIFIED BY INSPECTION.

TESTING

ATP IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

HANDLING, PACKAGING, STORAGE AND SHIPPING PROCEDURES ARE VERIFIED BY
INSPECTION.

(D) FAILURE HISTORY:

NO FAILURE HISTORY.

(E) OPERATIONAL USE:

TBS.

- APPROVALS -

RELIABILITY ENGINEERING:	D. R. RISING	<i>DRR</i>	:	<i>[Signature]</i>
DESIGN ENGINEERING	: K. KELLY		:	<i>[Signature]</i>
QUALITY ENGINEERING	: M. SAVALA	<i>MS</i>	:	<i>[Signature]</i>
NASA RELIABILITY	:		:	<i>[Signature]</i>
NASA SUBSYSTEM MANAGER	:		:	<i>[Signature]</i>
NASA QUALITY ASSURANCE	:		:	<i>[Signature]</i>

4-13-90