

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : CREW MODULE SEALS FMEA NO 01-4 -CS39 -1 REV:03/29

ASSEMBLY : STAR TRACKER  
P/N RI :  
P/N VENDOR:M83248/1-362, 329  
QUANTITY :1 P/N -362  
          :1 P/N -329

VEHICLE 102 103 104  
EFFECTIVITY: X X X  
PHASE(S): PL LO X OO X DO X LS

REDUNDANCY SCREEN: A-FAIL B-FAIL C-PAS  
PREPARED BY: APPROVED BY: APPROVED BY (NASA):  
DES W. HENRY DES *W.B. Henry 7/2/88* SSM *W.B. Henry 8/1/88*  
REL D. MAYNE REL *D.H. Mayne 5/2/88* REL *R.L. Gray 8/22/88*  
QE W. SMITH QE *W.S. Domsen 7-25-88* QE *R.L. Gray 9/1/88*

ITEM:  
SEALS, STAR TRACKER BOOM COLLAR STRUCTURAL ATTACH AND COVER PLATE

FUNCTION:  
THESE SEALS PREVENT LEAKAGE OF CREW MODULE ATMOSPHERE.

FAILURE MODE:  
LEAKAGE

CAUSE(S):  
CRACKS, LOW TEMPERATURE, MATERIAL DEGRADATION

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

- (A) FAILURE OF SINGLE SEAL WOULD RESULT IN THE LOSS OF CREW MODULE CONSUMABLES.
- (B) FAILURE OF A SINGLE SEAL WOULD RESULT IN THE LOSS OF CREW MODULE CONSUMABLES.
- (C) FAILURE OF A SINGLE SEAL WOULD RESULT IN LOSS OF CREW MODULE CONSUMABLES, HOWEVER, THIS WOULD NOT EXCEED THE MAKEUP CAPABILITY OF T ARPCS BUT WOULD POSSIBLY RESULT IN EARLY TERMINATION OF MISSION.
- (D) FAILURE OF SINGLE SEAL AND AN ADDITIONAL SEAL FAILURE WITHIN THE C MODULE COULD RESULT IN A LEAK RATE EXCEEDING THE ARPCS MAKEUP CAPABILITY RESULTING IN LOSS OF CREW/VEHICLE.

REDUNDANCY SCREENS: SEAL FAILS SCREENS "A" AND "B" BECAUSE LEAK TEST OF EACH SEAL INDIVIDUALLY IS NOT FEASIBLE.

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

(A) DESIGN  
THE BOOM COLLAR SEAL PREVENTS LEAKAGE OF CREW MODULE ATMOSPHERE BY

## SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM : CREW MODULE SEALS

FMEA NO 01-4 -CS39 -1

REV:03/29/8

SEALING INTERFACE BETWEEN STAR TRACKER BOOM SUPPORT COLLAR AND CREW MODULE STRUCTURE. THE SEAL IS STANDARD FLUOROCARBON ELASTOMER (VITON) RING FACE SEAL IN A DOVETAIL GROOVE ADJACENT TO STRUCTURAL ATTACH BOLTS WITH METAL TO METAL CONTACT AT INTERFACE. THE COVER PLATE SEAL PREVENT LEAKAGE OF CREW MODULE ATMOSPHERE BY SEALING INTERFACE BETWEEN ACCESS HOLE COVER PLATE AND CREW MODULE STRUCTURE IN STAR TRACKER WELL. THIS SEAL IS A STANDARD FLUOROCARBON ELASTOMER (VITON) O-RING USED AS FACE SEAL IN GROOVE OF COVER PLATE ADJACENT TO ATTACH BOLTS.

**(B) TEST**

ACCEPTANCE TESTS: TESTS CONSIST OF CREW MODULE HIGH PRESSURE TEST TO 14 PSID AND LOW PRESSURE TEST TO 3.2 PSID.

QUALIFICATION TESTS: QUALIFICATION TESTS WERE NOT PERFORMED - CERTIFICATION IS BASED ON ACCEPTANCE TESTS AND SEAL MATERIALS DATA. OMRSD: GROUND TURNAROUND INCLUDES PRE-LIFTOFF PRESSURIZATION TEST AT 2 PSID; HOWEVER, IT IS UNLIKELY TO DETECT SEAL LEAKAGE.

**(C) INSPECTION****RECEIVING INSPECTION**

RECEIVING INSPECTORS INSPECTS FOR DAMAGE AND WORKMANSHIP AND VERIFY SINGLE PIECE MOLDED CONSTRUCTION. RECEIVING INSPECTORS CHECK IDENTIFICATION AND WALL CROSS-SECTIONAL DIAMETER ON A S-3 SAMPLING BASIS. IT IS ALSO VERIFIED THAT SUPPLIER SUBMITTED THE REQUIRED REPORTS.

**CONTAMINATION CONTROL**

RECEIVING INSPECTORS VISUALLY INSPECT SEAL FOR CLEANLINESS. INSPECTORS ALSO VERIFY, BEFORE INSTALLATION, THAT THE SEAL AND SEALING SURFACE ARE CLEAN, PER MAO106-328.

**ASSEMBLY/INSTALLATION**

THE SEALS ARE INSTALLED PER MAO106-328. INSPECTORS VERIFY THAT THE SEAL AND THE SEALING SURFACE ARE NOT DAMAGED BEFORE INSTALLATION.

**TESTING**

THE INSPECTOR VERIFIES CREW MODULE HIGH PRESSURE TEST TO 14.7 PSID, AND LOW PRESSURE TEST TO 3.2 PSID.

**HANDLING/PACKAGING**

THE RECEIVING INSPECTORS VERIFY THAT THE SEAL IS INDIVIDUALLY PACKAGED WITH PART NUMBER, MANUFACTURER NAME, COMPOUND NUMBER AND CURE DATE. RECEIVING INSPECTORS VERIFY THAT THE SEAL IS PACKAGED IN A WAY THAT WILL PROTECT IT DURING STORAGE.

**(D) FAILURE HISTORY**

THERE HAVE BEEN NO ACCEPTANCE TEST, QUALIFICATION TEST, FIELD OR FLIGHT FAILURES ASSOCIATED WITH THIS FAILURE MODE.

**(E) OPERATIONAL USE**

IF INTERFACE LEAKAGE OCCURS, LOSS OF CREW MODULE CONSUMABLES CAN BE MONITORED AND ASSESSED FOR FEASIBILITY OF CONTINUING THE MISSION PER CABIN LEAK PROCEDURES AND FLIGHT RULES.