

SHUTTLE CRITICAL ITEMS LIST - ORBITER

SUBSYSTEM :ACTUATION MECH-RADIATORS FMEA NO 02-4G -156 -2 REV:03/07/88

ASSEMBLY :RADIATOR DEPLOYMENT CRIT. FUNC: 1R
 P/N RI :MC203-0002-0012,19,32,39 CRIT. HDW: 2
 P/N VENDOR:T01P31094 TULSA DIV VEHICLE 102 103 104
 QUANTITY :12 EFFECTIVITY: X X X
 :6 PER SIDE PHASE(S): PL LO OO X DO LS
 :3 PER PANEL

REDUNDANCY SCREEN: A-PASS B-N/A C-PASS

PREPARED BY:	APPROVED BY:	APPROVED BY (NASA):
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ITEM:
 HINGE FITTING, STRUCTURE

FUNCTION:
 ATTACHES DEPLOYABLE RADIATOR PANEL TO PAYLOAD BAY DOOR. ALLOWS ROTATION OF RADIATOR TO EXPOSE UNDER SURFACE FOR MAXIMUM COOLING CAPABILITY.

FAILURE MODE:
 STRUCTURAL FAILURE

USE(S):
 STRESS CORROSION, DEFECTIVE PART/MATERIAL OR MANUFACTURING DEFECT, EXCESSIVE LOAD, FAILURE/DEFLECTION OF INTERNAL PART, FATIGUE

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

(A,B) INCREASED LOAD ON REMAINING HINGES. POSSIBLE DEGRADATION OF DEPLOY/STOW CAPABILITY. FAILURE OF ANY HINGE MAY CAUSE MISALIGNMENT OF SHEAR FITTING OR PROBLEM ENGAGING LATCHES.

(C,D) NO EFFECT ON MISSION, VEHICLE OR CREW. LOSS OF ONE RADIATOR HINGE WILL NOT PREVENT CLOSING OF THE PAYLOAD BAY DOOR. LATCHING OF RADIATORS IS NOT CRITICAL FOR SAFE ENTRY UNLESS THE OTHER COOLANT LOOP HAS ALREADY BEEN LOST.

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DISPOSITION & RATIONALE:

(A) DESIGN (B) TEST (C) INSPECTION (D) FAILURE HISTORY (E) OPERATIONAL USE

(A) DESIGN

HINGE DESIGNED WITH POSITIVE MARGIN OF SAFETY FOR ALL DESIGN LOAD CONDITIONS WHICH INCLUDE RADIATOR DEPLOY/STOW WITH MAXIMUM STRUCTURAL DISTORTION AND HIGH Q BOOST LOADS. MATERIAL UTILIZED, 2024 ALUMINUM IS ACCEPTABLE AS INSTALLED TO STRESS AND GALVANIC CORROSION REQUIREMENTS. ALL ROTATING JOINTS EMPLOY DUAL ROTATING SURFACES TO PRECLUDE JAMMING DUE TO SINGLE SURFACE TO SURFACE BINDING. RIGGING/ADJUSTMENT CONTROLLED (REF. ML0308-0023). DESIGN PERMITS EXTRAVEHICULAR ACTIVITY (EVA) WORKAROUND IF PAYLOAD DOES NOT LIMIT ACCESS AND IF RADIATORS ARE FULLY DEPLOYED.

(B) TEST

QUALIFICATION TESTS: QUALIFICATION TESTS OF RADIATOR DEPLOYMENT MECHANISM ON FORWARD 15 FT. PAYLOAD BAY DOOR TEST ARTICLE (087) INCLUDE LIFE CYCLES, OPERATION WITH SIMULATED THERMAL DISTORTIONS OF HINGE LINE, AND VIBRO-ACOUSTIC. DEPLOYABLE RADIATORS RIGGED PER CONTROLLED SPECIFICATION ML0308-0023. OPERATION OF RADIATOR DEPLOYMENT MECHANISM VERIFIED IN CHECKOUT AT KSC WHICH INCLUDES RADIATOR FUNCTIONAL CHECK.

OMRSD: GROUND TURNAROUND INCLUDES MONITORING FUNCTIONAL CHECKS TO VERIFY NO BINDING OR JAMMING AND VISUAL INSPECTION OF HARDWARE TO ENSURE THAT PARTS ARE NOT BROKEN OR DEFORMED. THESE TESTS ARE PERFORMED FIRST FLIGHT AND FOR EVERY FLIGHT WHERE THE RADIATORS WILL BE DEPLOYED.

(C) INSPECTION

RECEIVING INSPECTION

MATERIAL IS VERIFIED BY PHYSICAL/CHEMICAL PROPERTIES BY CERTIFICATION IN RECEIVING INSPECTION.

CONTAMINATION CONTROL

HINGE ASSEMBLY IS PROTECTED TO PRECLUDE CONTAMINATION WHILE IN PICKUP FIXTURE AND DURING SHIPMENT.

ASSEMBLY/INSTALLATION

HINGE FITTING COMPLIANCE TO ENGINEERING DRAWING IS VERIFIED IN INSPECTION. INSTALLATION OF BEARINGS INTO RADIATOR FITTINGS IS ACCOMPLISHED PER MATERIAL PROCESSING PROCEDURE (MPP), AND TESTED RELATIVE TO PROOF LOAD AND TORQUE. WITNESSED AND VERIFIED BY INSPECTION. LOCATION AND FINAL INSTALLATION OF HINGE ASSEMBLY CONTROLLED BY FINAL ASSEMBLY JIG TOOL LOCATORS, AND VERIFIED BY INSPECTION.

NONDESTRUCTIVE EVALUATION

MACHINED DETAILS ARE SUBJECTED TO PENETRANT INSPECTION, VERIFIED BY INSPECTION.

CRITICAL PROCESSES

HEAT TREATING IS VERIFIED BY INSPECTION.

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TESTING

ROTATIONAL AND AXIAL MOVEMENT IS VERIFIED BY INSPECTION.

HANDLING/PACKAGING

HANDLING AND PACKAGING REQUIREMENTS VERIFIED BY INSPECTION.

(D) FAILURE HISTORY

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

(E) OPERATIONAL USE

NCNE.

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