

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE												

		102FM02														
NECK RING ASSEMBLY & VENT SEAL ASSEMBLY, ITEM 102	2/2	Physical jamming in open position.	END ITEM: Neck Ring cannot be rotated to engage eight latching pins which secure helmet to HUT.	A. Design - The disconnect operates by direct mechanical actuation of the locking latches through the external lock assembly. The design specifies tight neck ring clearances to reduce the possibility of foreign material getting into the locking mechanism. The springs and latches are lubricated using Krytox 240AC and the cam surfaces are coated with a dry film lubricant (Dow Corning 321). The Helmet is stowed in the Orbiter mated to the Neck Ring or HHF following final pre-flight inspections to preclude contamination by foreign matter prior to EVA. The materials used to make the screws (A-286 stainless steel), the lock-lock pin (303 stainless steel), and the spring (302 or 304 stainless steel) are designed for strength and corrosion resistance.												
A/L 9357-11 (1)		Contamination or foreign material causing obstruction.	GFE INTERFACE: Unable to mate helmet to HUT. SSA unable to function as a pressure garment.	Loose or missing lock subassembly screws and locking ring retainer screws are precluded in design by adherence to standard engineering torque requirements for screw installation and the use of thread locking material.												
A/L 9715-03 (1)		Defective spring. Missing or loose screws.														
			MISSION: Terminate EVA Prep. Loss of use of one EMU.	B. Test - Acceptance: An engagement force verification test is performed on each neck ring per Airlock ATP 9357-10 prior to acceptance by ILC.												
			CREW/VEHICLE: None.	PDA: Five neck ring plug engagements, actuations and disengagements are performed prior to the PDA pressure tests.												
			TIME TO EFFECT /ACTIONS: Seconds.	Certification: The neck ring was successfully tested (manned) during SSA certification to duplicate operational life. (Ref. EM 83-1083, EM 98-0008 and ILC Report 0111-711330). The following usage reflecting requirements fo significance to the neck ring was documented during certification:												
			TIME AVAILABLE: N/A	<table border="1"> <thead> <tr> <th>Requirement</th> <th>S/AD</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Actuation Cycles</td> <td>300</td> <td>1080</td> </tr> <tr> <td>Pressure Hours</td> <td>458</td> <td>916</td> </tr> <tr> <td>Pressure Cycles</td> <td>300</td> <td>600</td> </tr> </tbody> </table>	Requirement	S/AD	Actual	Actuation Cycles	300	1080	Pressure Hours	458	916	Pressure Cycles	300	600
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			REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	The Pivoted HUT neck ring successfully subjected to an ultimate pressure of 13.2 psid during SSA certification testing (Ref. ILC Report 0111-79405). This is 1.5 times the maximum BTA operating pressure based on 8.8 psid. The neck ring also passed shock, vibration, and acceleration testing to S/AD limits, Ref. Hamilton Standard TER's 3043, 3048, 3067, and 3076.												
				The Planar-HUT neck ring was successfully subjected to an ultimate pressure of 17.6 psid during Ssa certification testing (Ref. ILC Report 0102-711982). Thios is 2.0 times the maximum BTA operating pressure based on 8.8 psid. The neck ring also passed shock, vibration, and acceleration testing to S/AD limits, Ref. Hamilton Standard TER's 3807 and 3808.												
				C. Inspection - Components and material manufactured to ILC requirements at an Approved Supplier are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the materials received are as identified in												

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		102FM02		<p>the procurement documents, that no damage has occurred during shipment and that supplier certifications have been received which provide traceability.</p> <p>The following MIP's are performed during the neck ring assembly manufacturing process to assure the failure causes are precluded from the fabricated item.</p> <p>Verify operation sheet completion. Verify Engage and disengage five times. Verify engagement force (20-lbs max). Verify conformance of all dimensions to drawing. Verify presence of screws, screw torquing and thread lock adhesive.</p> <p>During PDA, the neck ring assembly is inspected for VC level cleanliness per ILC Document 0111-70028J (Pivoted HUT) or 0111-710112 (Planar HUT).</p> <p>D. Failure History - B-EMU-102-A039 (8/15/01) - Difficulty in mating helmet to neck ring. Not a failure. Opened in error.</p> <p>E. Ground Turnaround - Inspected for non-EET processing per FEMU-R-001, Pre-Flight Inspections and Final Structural and Leakage. FEMU-R-001 Para 8.2 EMU Preflight KSC Checkout for EET processing. Verify HUT-to-Suit Disconnect Lock Function. Additionally, every 4 years or 229 hours of manned pressurized time the neck ring is disassembled, inspected, cleaned, lubricated and reassembled. Following reassembly proper operation is verified and a subjective engagement test performed.</p> <p>F. Operational Use - Crew Response - PreEVA: Trouble shoot problem, if no success, terminate EVA prep. Consider EMU 3 if available. EMU no go for EVA. PostEVA: Trouble shoot problem, if no success, secure helmet for landing. Training - No training specifically covers this failure mode. Operational Considerations - Flight rules define go/no criteria related to EMU suit pressure integrity. EVA c/l and FDF procedures verify hardware integrity and systems operational status prior to EVA.</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-102 HARD UPPER TORSO (HUT)
CRITICAL ITEM LIST (CIL)
EMU CONTRACT NO. NAS 9-97150

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