

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

102FM06				
NECK RING ASSEMBLY & VENT SEAL ASSEMBLY, ITEM 102 ----- A/L 9357-11 (1)	3/1RB	Fails to remain closed, neck ring locking mechanism. Contamination. Defective spring. Impact.	END ITEM: Loss of helmet primary latching mechanism which prevents engagement of attachment pins. GFE INTERFACE: None for single failure. There are three redundant locking mechanisms. MISSION: None for single failure. CREW/VEHICLE: None for single or double failure. Loss of crewman with triple failure.	A. Design - The disconnect operates by direct mechanical actuation of the locking latches through the external lock assembly. The design specifies tight clearances at the Helmet/Neck Ring interface to reduce the possibility of foreign material getting into the mated interface. The Helmet is stowed in the Orbiter mated to the Neck Ring or HHF to preclude contamination by foreign matter. All metallic parts, including springs, are designed to cycle a minimum of 15 years of use. The position of the neck ring in relation to the DCM and PLSS significantly reduces the possibility of impact directly at the neck ring, thus minimizing failure due to impact. Additionally, the helmet/EVVA Neck Ring provides a barrier to micrometeoroid impact. B. Test - Acceptance: An engagement force verification test is performed on each neck ring per Airlock ATP 9357-10 prior to acceptance by ILC. PDA: The following tests are conducted at the HUT Assembly level in accordance with ILC Document 0111-70028J (Pivoted HUT) or 0111-710112 (Planar HUT). Five neck ring plug engagements, actuations and disengagements are performed prior to the PDA pressure tests. 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 of significance to the neck ring was documented during certification: Requirement S/AD Actual ----- ---- ----- Actuation Cycles 300 1080 Pressure Cycles 300 600 The Pivoted HUT neck ring was 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

A/L 9715-03 (1)				

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		102FM06		<p>are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the materials received are as identified in the procurement documents, that no damage has occurred during shipment and that supplier certifications have been received which provides traceability information.</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 to all dimensions of drawing.</p> <p>During PDA: The following inspection points are performed at the HUT assembly level in accordance with ILC Document 0111-70028J (Pivoted HUT) or 0111-710112 (Planar HUT):</p> <p>Verify neck ring closure dimensions. Verify neck ring disconnect engagement 5 times and record force.</p> <p>D. Failure History - None.</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/Helmet secondary lock function.</p> <p>F. Operational Use - 1. Crew Response. Pre/post-EVA : If detected during helmet donning/doffing, consider third EMU if available. Otherwise, EMU no go for EVA. If single failure not detected, no response. EVA : No response, single failure not detectable by crew or ground. 2. Special Training No training specifically covers this failure mode. 3. Operational Considerations. No constraints for single failure. EVA checklist 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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