

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE																								
BRIEF ASSEMBLY, ITEM 104 ----- 0104-811071-04 (1)	2/1R	104FM27 Loss of primary axial restraint crotch buckle. Defective material, weld.	END ITEM: Loss of primary axial restraint. GFE INTERFACE: Axial load will be transferred to secondary restraint. Webbing. MISSION: None. CREW/VEHICLE: None with single failure loss of crewman with loss of secondary restraint. Webbing. TIME TO EFFECT /ACTIONS: Minutes. TIME AVAILABLE: Days. TIME REQUIRED: Hours. REDUNDANCY SCREENS: A-PASS B-N/A C-PASS	A. Design - The crotch buckle is fabricated from 17-4 stainless steel casting. The crotch buckle "D" rings are fabricated from 17-4 Condition A wire and full penetration welded per MIL-W-8611. The crotch buckle assembly is heat treated to H-1050 per MIL-H-6875 after welding. Finishing operations consist of dry honing, ultrasonic cleaning, and passivation. Tensile testing of the crotch buckle assembly demonstrated a minimum ultimate strength of 1836 lbs and a yield strength of 1643 lbs. At 4.4 psid (normal operating pressure) the S/AD limit load is 483 lbs giving the buckle a safety factor of 3.8 for ultimate and 3.4 for yield. At 5.5 psid (max failure pressure), the buckle provides a safety factor for ultimate of 3.8 against a limit load of 485 lbs. At 8.8 psid (max BTA operating pressure), the buckle provides a safety factor for ultimate of 4.7 against a S/AD limit load of 393 lbs. The S/AD minimum safety factor of hardware at 4.4 psid is 2.0 for ultimate and 1.5 for yield. At both 5.5 psid and 8.8 psid, the S/AD minimum safety factor for hardware is 1.5 for ultimate. B. Test - Acceptance: Component - See Inspection. PDA Test - The following tests are conducted at the brief level in accordance with ILC Document 0111-710112: Proof pressure test at 8.0 + 0.2 - 0.0 psig for a minimum of 5 minutes conducted with the TMG removed. Certification Test - The crotch buckle was successfully tested (manned) during SSA certification to duplicate 458 hours operational life (Ref. ILC Report 0111-711330). The following usage, reflecting requirements of significance to the crotch buckle, was documented during certification: <table border="1"> <thead> <tr> <th>Requirement</th> <th>S/AD</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Hip Abd/Add</td> <td>458</td> <td>1200</td> </tr> <tr> <td>Hip Flex/Ext.</td> <td>1524</td> <td>3200</td> </tr> <tr> <td>Waist Flex/Ext.</td> <td>1234</td> <td>2800</td> </tr> <tr> <td>Waist Rotation</td> <td>2466</td> <td>6000</td> </tr> <tr> <td>Don/Doff Cycles</td> <td>98</td> <td>400</td> </tr> <tr> <td>Pressure Hours</td> <td>458</td> <td>916</td> </tr> <tr> <td>Walking Steps</td> <td>4320</td> <td>77760</td> </tr> </tbody> </table> 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 hardware received is as identified in the procurement documents, that no damage has occurred during shipment and that the supplier certifications have been received which provide traceability information. The crotch buckle is x-ray inspected, the crotch buckle rings are inspected using Magnetic particle Technique, and the welds are x-ray inspected. Crotch	Requirement	S/AD	Actual	Hip Abd/Add	458	1200	Hip Flex/Ext.	1524	3200	Waist Flex/Ext.	1234	2800	Waist Rotation	2466	6000	Don/Doff Cycles	98	400	Pressure Hours	458	916	Walking Steps	4320	77760
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		104FM27		<p>buckle integrity is verified after primary axial restraint tensile loading.</p> <p>During PDA, the following inspection points are preformed at the Lower Torso Assembly level in accordance with ILC Document 0111-710112:</p> <ol style="list-style-type: none">1. Visual inspection for material degradation.2. Visual inspection for structural damage following proof pressure test. <p>D. Failure History - None.</p> <p>E. Ground Turnaround - None, for every component within its limited life requirement.</p> <p>Every 4 years or 229 hours of manned pressurized time the lower torso restraint and bladder assembly is removed from the LTA and subjected to complete visual inspection for material degradation or damage.</p> <p>F. Operational Use - Crew Response - Pre/post-EVA : If not detected, no response. If detected audibly or tactily, troubleshoot problems. If no success, use spare LTA if available or terminate EVA prep. EVA : Single failure not detectable, no response. Special Training - No training specifically covers this failure mode. Operational Considerations - Not applicable.</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-104 LOWER TORSO ASSEMBLY (LTA)
CRITICAL ITEM LIST (CIL)

EMU CONTRACT NO. NAS 9-97150

Prepared by: *[Signature]* 3/27/02
HS - Project Engineering

Approved by: *[Signature]* 12/26/02
NASA - SSA/SSM

M. Snyder
HS - Reliability

[Signature] 5/17/02
NASA - EV/ISSM

Alan Plough for RCM
HS - Engineering Manager

[Signature] 5/17/02
NASA - S&ML

Alan Th. Schubert 5/23/02
NASA - MOD

Joe Tamm 6/04/02
NASA - C/OW

[Signature] 6/13/02
NASA - Program Manager