

DATE: October 21, 1988

FMEA #: 465-S70-0606-01-QD1, QD2, QD3

END ITEM EFFECTIVITY:

X	X	X
OV102	OV103	OV104

MODEL NO./NAME: S70-0606

ORBITER SUBSYSTEM: Auxiliary Power Unit, Lubricating Oil

PART NUMBER:	PART NAME:	REFERENCE DESIGNATION:	QTY.:
MC621-0038-0400	Quick Disconnect	QD1 QD2 QD3	3

CRITICALITY NUMBER: 2

FUNCTION: Connects supply, return, and checkout lines to APU.

CRITICAL FAILURE MODE: Leak Before/After Disconnect

CAUSE: Internal seal failure or mechanical shock.

FAILURE EFFECT ON:

- (A) END ITEM: None.
- (B) INTERFACING SUBSYSTEM(S): None.
- (C) ORBITER: Oil spill in aft fuselage may reach tiles on underside of orbiter.
- (D) PERSONNEL: None.

HAZARDS: Oil spill would require extensive cleanup of orbiter aft fuselage and possible replacement of tiles.

CORRECTIVE ACTION: Replace coupling.

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ACCEPTANCE RATIONALE

DESIGN: The quick disconnect is made of stainless steel and designed with a check off poppet on both sides limiting the fluid loss to less than 5 cubic centimeters (cc) per each uncoupling. The three disconnects are designed to handle lube oil at 100 ± 5 psig at a temperature range of 35°F to 160°F . Oil is sometimes heated to 240°F as a contingency operation. Procurement specification MC261-0038 requires that the QD's are thermal cycle tested at 275°F which accommodates the contingency temperatures. With maximum APU inlet pressure of 25 psi, the QD's have a safety factor of 4:1.

TEST: The development and procurement specification MC261-0038 requires the QD to be acceptance tested by the supplier prior to delivery. After the disconnect was installed in the unit, a complete ATP including a leak and proof test was performed. The same ATP requirements were performed after the unit was modified later to install the heater system.

The OMI V1078 requires a periodic test to be performed prior to each orbiter attachment to verify the disconnect is pressure tight and there is no external leakage. The QD and hose assembly is visually inspected semi-annually per OMI V6A14.

INSPECTION:

RECEIVING INSPECTION: Incoming materials are verified by inspection for materials and processes certification. All machined items are dimensionally inspected and verified.

CONTAMINATION CONTROL: All surfaces which contact fluid media shall be cleaned per MA0110-301 level 300 and are verified by inspection. (Ref. ADP MC621-0038 Rev. B (C01))

ASSEMBLY/INSTALLATION: Prior to each use, the mating surfaces of the QD are inspected for damage, deterioration, and contamination. Each coupling is carefully examined to determine conformance to the requirements. Particular attention is given to weight, workmanship, finish, dimensions, construction, cleanliness, identification, marking, traceability level, and that certified materials and processes have been used.

CRITICAL PROCESSES: Process of passivation, gold anodizing, and lubricating oil per MIL-L-23699B are verified by inspection.

TESTING: Functional examination and performance test due to environmental conditions are completely done with inspections.

HANDLING/PACKAGING: Handling and packaging for shipment requirements are verified by inspection per MK0115-0011 Rev B.

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OPERATIONAL USE: Quick disconnects can be coupled and uncoupled while under pressure with fluid in them without the use of any tools or other equipment. This allows the servicing unit to be prepared, fluid circulated and sampled prior to attachment to the orbiter system. The spring loaded check off poppet insures positive closure and minimal fluid loss while coupling and uncoupling to the orbiter. Emergency procedure is to open circuit breaker 1 and close manual valve 3 stopping the flow of oil to the APU.

DETECTION: Leakage will be visually detected during servicing.

CORRECTIVE ACTION: Oil will be cleaned up and any damage will be repaired before the orbiter is launched.

TIME TO EFFECT: Failure will occur upon pressurization of unit.

FAILURE HISTORY: No failure is recorded in PRACA database.