

DATE: June 13, 1988

FMEA #: 46-S70-0778-02-MD*-01

END ITEM EFFECTIVITY:

X	X	X
OV102	OV103	OV104

MODEL NO/NAME: S70-0778, APU QD/Filter Set

ORBITER SUBSYSTEM: APU System QTY: 3

PART NUMBER: PART NAME: REFERENCE DESIGNATION:

ME276-0032-0002 Coupling, High Point * MD1, MD2, MD3
Bleed

CRITICALITY NUMBER: 2

FUNCTION: Connect to orbiter APU for high point bleed.

CRITICAL FAILURE MODE: External leakage.

CAUSE: Seal failure.

FAILURE EFFECT ON:

- (A) END ITEM: None; servicing halted, emergency precautions initiated.
- (B) INTERFACING SUBSYSTEM(S): None; fluid lines must be drained.
- (C) ORBITER: Possible damage to orbiter internal aft fuselage components from leaking hypergolic fluid or from fire.
- (D) PERSONNEL: Hazard to personnel from leaking hypergolic fluid and fire hazard (personnel in SCAPE suits during operation).

HAZARDS: Escape of N2H4, possibility of fire.

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ACCEPTANCE RATIONALE

DESIGN: Coupling is composed of corrosion-resistant steel and incorporates an internal flow control poppet which is manually opened and spring forced closed. Weight of the coupling is less than 1 pound. A locking device will hold ground and flight halves together when engaged. There is an open-poppet leak check setting for the ground half to verify sealing prior to use. The operating life is 400 cycles over 10 years.

TEST:

DESIGN VERIFICATION: Acceptance tests per ME276-0032 include operating, proof and burst pressures (400, 600, 800 psig); engagement/disengagement cycling; internal/external leakage; pressure drop; vibration.

PRE-OPERATIONAL: Annual preventive maintenance per OMI V6A25 prior to use includes checks for missing parts, identification; cracks, corrosion, or deformation; proof pressure tags; fluid leakage; and general cleanliness. The APU system leak and functional test is performed per V1019.

INSPECTION: Receiving inspection is performed for all couplings. Couplings are inspected for cleanliness verification, including vacuum drying and lubricant removal of internal surfaces to level 100 of MA0110-301. Each coupling and its protective cap are prepackaged to assure cleanliness level maintenance prior to packing. Sealing surfaces are inspected for damage prior to final assembly. Inspection also covers finish, dimensions, identification, and marking.

OPERATIONAL USE: Isolation of individual QD using Fuel Servicing Unit manual valves, draining of line per V1036. This also includes the use of an aspirator to provide suction, and instructions for spill containment, cleanup, and verification of airborne coupling closure.

FAILURE HISTORY: The PRACA database identified two cases of failing leak check, and several cases of broken dust cap tethers (time period 8/85 - 10/87). Other failure data revealed nine instances of QD/filter assembly leakage, including four leak check failures (10/79 - 10/83).