

DATE: October 16, 1990

FMEA #: 35-S70-0517-05--01

END ITEM EFFECTIVITY:

|       |       |       |
|-------|-------|-------|
| X     | X     | X     |
| OV102 | OV103 | OV104 |

MODEL NO/NAME: S70-0517, LH<sub>2</sub> T-0 Umbilical Carrier Plate

ORBITER SUBSYSTEM: Aft Fuselage

| PART NUMBER:    | PART NAME:                    | REFERENCE<br>DESIGNATION: | QUANTITY<br>(PER SYSTEM) |
|-----------------|-------------------------------|---------------------------|--------------------------|
| ME286-0068-0003 | Filter, In-Line,<br>Miniature | ---                       | 1                        |

CRITICALITY NUMBER: 18

FUNCTION: Filter incoming He purge gas for routing to purge cans of carrier plate.

CRITICAL FAILURE MODE: Clog (loss of purge).

CAUSE: Contaminants in ground He

FAILURE EFFECT ON:

- (A) END ITEM: During fuel flow operations, H<sub>2</sub> gas may accumulate and escape from purge can; possible fire, damage to carrier plate, purge seals, fill and drain line.
- (B) INTERFACING SUBSYSTEM(S): Possible damage to ground LH<sub>2</sub> system if leaking H<sub>2</sub> ignites.
- (C) ORBITER: Loss of orbiter due to possible damage to orbiter exterior due to fire/explosion if leaking H<sub>2</sub> is ignited.
- (D) PERSONNEL: Loss of crew life due to potential fire/explosion.

HAZARDS: Cut-off of purge could lead to ice build-up and damage to aft fuselage TPS, or possible fire/explosion if accompanied by hydrogen leak.

15-S70-0517-05--01 (Continued)

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**ACCEPTANCE RATIONALE**

**DESIGN:** Filter is designed to be compatible with KC126 unions using teflon seal rings. Filter element, once installed, is non-separable, and no non-metals are used in the assembly (all parts are of corrosion-resistant steel). Filter element is single layer Dutch weave wire mesh which traps particles greater than 25 microns in size. Filter operates in any attitude with flow in either direction.

**TESTS:**

**ACCEPTANCE TESTS:** Acceptance tests per ME286-0068 include product examination, proof pressure, filter cleanliness, bubble point test and filter drying.

**CHECK-OUT TEST:** Check-out tests per ME286-0068 include clean pressure drop test, vibration, filtration and contamination capacity test, differential pressure test, lot acceptance test and reverse flow.

**CERTIFICATION OR QUALIFICATION TESTS:** The filters are in compliance with the source control drawing ME286-0068 and T-0 Umbilical Carrier Plate document ML0208-0012. No certification or qualification tests were conducted on these filters.

**INSPECTION:** Filter case and element are precision cleaned to level 100A of MA0110-301, also passivated, vapor degreased, and sealed in contamination barrier bags and foam-cushioned for shipping (performed in a Class 100,000 clean room or better).

The filter is required to be replaced with a new filter yearly or when delta pressure reaches 50 psia.

**OPERATIONAL USE:** Cutoff of liquid hydrogen flow through carrier plate to preclude leakage, icing. Securing of LH<sub>2</sub> system per S1014. Occurrence of filter clogging is minimized by sampling the media (He) for cleanliness prior to loading.

Leakage can be detected by hazardous gas detection system. Terminate and purge supply line if leakage exceeds 3.5% per launch commit criteria.

**FAILURE HISTORY:** No carrier plate-related failures were reported.