

Critical Items List (CIL) Sheet

Critical Item: Filter **B/L:** 005.00
Total Quantity: 3 **System:** MPS
Find Number: PD 10, PD8, PD11
Criticality Category: 1 (Failure Mode 1)
FMEA/CIL No: STS85-0205 A **System/Area:** MPS
NASA **PMN/** S70-0517
Part No: ME286-0066-0012 **Name:** LH2 T-0 Umbilical
Mfg/ Wintec **Drawing/**
Part No: 14228-633-12 **Sheet No:** GW70-580517
Function: (A) Filters GHe gas for H2 Pre-pressurization @ PD10, and (B) @ PD 8, and (C) Filters GN2 for SSME engine purges @ PD11.

Critical Failure Mode/Failure Mode Nos: Passes Contaminants/35-S70-0517-02-*--02 (1)

Failure Cause: Manufacturing defect, filter degradation or corrosion

Failure Effect:

- (A) **End Item:** Damage to GN2 or GHe QD poppet valves or Orbiter check valves.
- (B) **Interfacing Subsystem:** None.
- (C) **Orbiter:** Loss of orbiter due to (1) Contamination of SSME (requires failure of Orbiter filters).
- (D) **Personnel:** Loss of crew life during ascent (depends on level and composition of contaminants) due to loss of Orbiter.

ACCEPTANCE RATIONALE

Design: - Filter operating parameters

Flow:	7263 SCFM (A); 40 gpm (B & C)
Filtration:	10 micron absolute; 25 micron Maximum particle size
Pressure Drop:	<12 psi
Actual Operating Pressure:	458 psig (A), 4500 psig (B), 750+/- 50 psig (C)
Design Operating Pressure:	5300 psig
Proof Pressure:	7950 psig
Burst Pressure:	21200 psig
Contaminant cap.:	1.0 grams
Element collapse pressure:	1500 psi differential
Upstream filtration:	Filter A83089 & A83091 (A) A75683 (C)

Filter elements and other welded parts are composed of corrosion resistant steel. Filter element is Dutch weave wire mesh cloth that removes particles of greater than 25 microns in size. The filter element meets the NSTS 07700, Volume 10 paragraph 3.6.12.1.1.2.2.1 requirement for filter design service life. The filter has a separable type housing and a replaceable element. Non-metal parts are Teflon. The filter is designed to operate within specifications for GN2/He. Filter will withstand differential pressure up to 1,500 psi in direction of flow before collapse. Occurrence of filter overloading is minimized by sampling the media (GN2/He) for cleanliness prior to loading. All hardware and gases used in the GSE, from the tank facility to the flight interface, comply with SE-S-0073 and SN-C-0005 for contamination control and component design.

Test: The ME286-0066 filter procurement specification requires the following tests: Acceptance tests include product examination, proof pressure test for no less than three minutes, element cleanliness, bubble point test, element drying, case cleanliness and external leakage. Check out tests per ME286-0066 include shipping capability test, clean pressure drop test, reverse flow, filtration and contamination capacity test, collapse test and lot acceptance test. Certification or Qualification tests: The filter is in compliance with source control drawing ME286-0066. Re-certification of this filter is performed per OMRSD File VI when contamination is suspected.

Inspection: Filters are subject to cleanliness verification per Level 100A of MAO110-301C product cleanliness requirements; also inspection of filter for sealing, packing, and shipping. Filters are inspected for mating to QDs prior to installation of QDs into the carrier plate. The filter is inspected during Operation 40 of . The filter is inspected during Operation 40 of OMI V6C42 and OMRSD File VI requires annual filter replacement.

OMRSD File VI TBD.

Failure History: Current data on test failures, unexplained anomalies, and failures experienced during ground processing activities can be found in the PRACA database. The PRACA database was researched and 50 entries were found on this component. Most of the entries were for failure to meet the 10-micron specification for the bubble point test. These items were found during routine tests and inspections and scrapped. Other entries concerned improper installation, where Teflon O-rings were cut, allowing passage of contaminants. The discrepant filters were detected through abnormal flow rates. No failures in the critical mode have been recorded during launch countdown, when the failure could have Category I effects. The GIDEP failure data interchange system has been researched and no failure data was found on this component in the critical failure mode.

Operational Use:

-Correcting Action: There is no action that can be taken to mitigate the failure effect.

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-Timeframe: Since no correcting action is available, timeframe does not apply.