

SRB CRITICAL ITEMS LIST

SUBSYSTEM: THRUST VECTOR CONTROL

ITEM NAME: Fuel Pump Filter

PART NO.: 5903458  
(part of 740412/734579(ALT.))

FM CODE: A01

ITEM CODE: 20-01-13

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Seconds

NO. REQUIRED: 2

DATE: March 31, 2000

CRITICAL PHASES: Boost

SUPERCEDES: March 1, 1994

FMEA PAGE NO.: A-37

ANALYST: R. Imre/S. Parvathaneni

SHEET 1 OF 4

APPROVED: S. Parvathaneni

FAILURE MODE AND CAUSES: Clogged (System A and B) caused by:

- o Contamination

FAILURE EFFECT SUMMARY: Loss of TVC will lead to vehicle breakup and loss of mission, vehicle and crew. One success path remains after the first failure. Operation is not affected until both paths are lost.

REDUNDANCY SCREENS AND MEASUREMENTS:

- 1) Pass - Filters are inspected and functionally tested during turnaround and refurbishment.
- 2) Pass - APU turbine speed measurements B46R1406C, B46R1407C, B46R1408C, B46R1409C.
- 3) Fail - Contamination.

RATIONALE FOR RETENTION:

A. DESIGN

- o The Fuel Pump Filter is designed and qualified in accordance with end item specification 10SPC-0050. (All Failure Causes)
- o The filter is designed as a replaceable 25 micron absolute unit. (Contamination)
- o Hydrazine is filtered through a 25 micron filter upstream of the fuel pump filter. (Contamination)

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- o The filter will have a pressure drop of no greater than 5.0 psi clean. (Contamination)
- o The filter will have a pressure drop of no greater than 50.0 psi after entrapment of 1cc of fine solids at maximum flow rate. (Contamination)
- o The filter is replaced after each flight. (Contamination)
- o Fluid procurement is controlled per SE-S-0073. (Contamination)
- o Qualification testing verified design requirements as reported in Sundstrand APU Qualification Test Report AER-1539-6 Rev. B. (Contamination)

#### B. TESTING

- o Acceptance testing is performed per Sundstrand ATP TS2409 Rev. Y on all new units. This includes verification of performance with a hotfire functional test. (Contamination)
- o During refurbishment and prior to reuse the APU fuel filter is subjected to the same ATP as new units. (Contamination)
- o Helium (influent) is verified for cleanliness and composition (purity and particulate count) prior to fuel pump shaft seal leak check per 10REQ-0021, para. 2.3.2.5. (Contamination)
- o Helium is verified for cleanliness and composition (purity and particulate count) prior to introduction to on-board circuits per 10REQ-0021, para. 2.3.2.5. (Contamination)
- o Hydrazine is verified for cleanliness and composition (purity and particulate count) prior to introduction to on-board hydrazine circuits per 10REQ-0021, para. 2.3.2.1 and OMRSD File V, Vol. 1 Requirement Number B42AP0.010. (Contamination)
- o GN2 is verified for cleanliness and composition (purity and particulate count) prior to introduction to on-board hydrazine circuits per 10REQ-0021, para. 2.3.2.2 and OMRSD File V, Vol. 1 Requirement Number B42AP0.012. (Contamination)
- o GN2 (from MLP portable panels) is verified for cleanliness and composition (purity and particulate count) prior to introduction to on-board hydrazine circuits per OMRSD File V, Vol. 1, Requirement Number B42AP0.012. (Contamination)
- o Proper TVC system functional test is performed during hotfire operations per 10REQ-0021, para. 2.3.16. (Contamination)
- o SRB HPU performance is monitored by automated software in GLS per OMRSD File II, Vol. 1, Requirement Number S00FR0.070. (Contamination)

The above referenced OMRSD testing is performed every flight.

C. INSPECTION

VENDOR RELATED INSPECTIONS

- o Vendor inspection and test records are verified per SIP 1128 by USA SRBE PQAR. (Contamination)
- o Witnessing of acceptance test is performed by vendor and USA SRBE, per SIP 1128 by USA SRBE PQAR. (Contamination)
- o Verifications that are required on new units are performed on refurbished units per SIP 1128 by USA SRBE PQAR. (Contamination)
- o Critical processes
  - None

KSC RELATED INSPECTIONS

- o Helium (influent) cleanliness and composition (purity and particulate count) are verified prior to fuel pump shaft seal leak check per 10REQ-0021, para. 2.3.2.5. (Contamination)
- o Precision cleaning of tubes/hoses is verified by USA SRBE per 10REQ-0021, para. 2.3.0. (Contamination)
- o Helium cleanliness and composition (purity and particulate count) are verified prior to introduction to on-board circuits per 10REQ-0021, para. 2.3.2.5. (Contamination)
- o Hydrazine cleanliness and composition (purity and particulate count) are verified prior to introduction to on-board hydrazine circuits per 10REQ-0021, para. 2.3.2.1 and OMRSD File V, Vol. 1 Requirement Number B42AP0.10. (Contamination)
- o GN2 cleanliness and composition (purity and particulate count) are verified prior to introduction to on-board hydrazine circuits per 10REQ-0021, para. 2.3.2.2 and OMRSD File V, Vol. 1 Requirement Number B42AP0.012. (Contamination)
- o Proper function of TVC system is demonstrated during Hotfire operations per 10REQ-0021, para. 2.3.16 to include hotfire. (Contamination)
- o GN2 (from MLP portable panels) cleanliness and composition are verified prior to introduction to on-board hydrazine circuits per OMRSD File V, Vol. 1 Requirement Number B42AP0.012. (Contamination)
- o TVC Couplings (Both SRB and GSE) are inspected each time prior to mating per 10REQ-0021 para. 2.3. After transfer to SPC they are inspected prior to mating per File V, Vol. I, requirement number B42GEN.070. (Contamination).
- o GN2 (from servicing cart) cleanliness and composition (purity and particulate count) are verified prior to introduction to on-board hydrazine circuits per OMRSD File V, Vol. 1, Requirement Number B42AP0.012. (Contamination)

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- o Hydrazine (from servicing cart) cleanliness and composition (purity and particulate count) are verified prior to introduction to on-board hydrazine circuits per OMRSD File V, Vol. 1 Requirement Number B42AP0.010. (Contamination)

D. FAILURE HISTORY

- o Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

- o Not applicable to this failure mode