

SRB CRITICAL ITEMS LIST

SUBSYSTEM: THRUST VECTOR CONTROL

ITEM NAME: Fuel Filter

PART NO.: 10203-0016-801

FM CODE: A06

ITEM CODE: 20-01-08

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Seconds

NUMBER REQUIRED: 2

DATE: March 31, 2000

CRITICAL PHASES: Boost

SUPERCEDES: March 31, 1997

FMEA PAGE NUMBER: A-15A

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SHEET 1 OF 4

APPROVED: S. Parvathaneni

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FAILURE MODE AND CAUSES: Ineffective filtering (systems A and B) caused by:

- o Material defect
- o Manufacturing defect
- o Contamination

FAILURE EFFECT SUMMARY: Loss of TVC will lead to 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 - Refurbishment cleanliness tests and verifications, 10SPC-0131.
- 2) Fail - Ineffective filtering is not readily detectable.
- 3) Fail - Contamination

RATIONALE FOR RETENTION:

A. DESIGN

- o The Fuel Filter is designed per Source Control Drawing 10203-0016 and is qualified in accordance with end item specification 10SPC-0049. (All failure causes)
- o Filter element is 304L/321/347 CRES per 10SPC-0049. (Material Defect)
- o Filter is 25 micron absolute with a contaminant capacity of 1.0 gram of AC fine dust at 0.3 LB/SEC flow rate and 3.0 psid or less. (Contamination)
- o Fluid procurement is controlled by SE-S-0073. (Contamination)

- o Element collapse pressure is 400 psid. Normal pressure differential is 0.5 psid at rated flow. (All Failure Causes)
- o Qualification testing verified design requirements as reported in ARDE qualification test report, QA41006-19. (All Failure Causes)

B. TESTING

- o Acceptance testing is performed per Wintec ATP 15228-591 on each new flight article. This includes Bubble Point Testing, Visual Examination, Proof Pressure Test to 800 psig, Flow Test and Cleanliness Verification. (all failure causes)
- o During refurbishment and prior to reuse the fuel filter is reworked per 10SPC-0131 and acceptance tested by USA SRBE/TBE Florida operations per the criteria of 10SPC-0049. This includes visual examination, Bubble point test, Proof pressure test to 825 ± 25 psig for 5 minutes with no evidence of external leakage or failure or permanent deformation, External leakage $\leq 1.0 \times 10^{-6}$ SCCS of helium when pressurized to 825 ± 25 psig for 5 minutes, Flow Test and Cleanliness Verification. (All failure causes)
- o Filter and filter attach tubing are precision cleaned by USA SRBE per 10PRC-0339. (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 TVC system functional test is performed during hotfire operations per 10REQ-0021, para. 2.3.16. (All Failure Causes)
- o Helium leak test to less than 1×10^{-6} sccs is performed per 10REQ-0021, para. 2.3.3.1. (All Failure Causes)
- 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)

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C. INSPECTION

I. VENDOR RELATED INSPECTIONS

- o Verification of material test reports by USA SRBE PQAR per SIP 1213. (Material Defect)
- o Witnessing of acceptance test by USA SRBE PQAR per SIP 1213. (All Failure Causes)

NOTE: Inspection per SIP 1213 is performed on USA SRBE procured filters only. Filters procured by Arde undergo verification by USA SRBE that all tests and inspections were performed per 1110.

o CRITICAL PROCESSES/INSPECTIONS

- None

II. KSC RELATED REFURBISHMENT INSPECTION

- o Visual inspection of Fuel Filter will be performed per 10SPC-0131, para. II. (All Failure Causes)
- o Functional testing of Fuel Filter will be performed per 10SPC-0131, paragraph IV.

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All manual tests will be witnessed by Quality or verified for those instances when controlled software is utilized and a test report is generated. (All Failure Causes)

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III. KSC RELATED ASSEMBLY AND OPERATIONS INSPECTION

- o Precision cleaning of filter/tubes/hoses is verified by USA SRBE 10PRC-0339. (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 B42AP0.010. (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. (All Failure Causes)
- o GN2 (from MLP portable panels) cleanliness and composition (purity and particulate count) are verified prior to introduction to on-board hydra- zine circuits per OMRSD File V, Vol. 1 Requirement Number B42AP0.012. (Contamination)

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- 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)

- o System pressure decay test is monitored per 10REQ-0021 para. 2.3.3.1.b for the fuel system prior to hot fire. (All failure causes)

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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.