

SRB CRITICAL ITEMS LIST

SUBSYSTEM: THRUST VECTOR CONTROL

ITEM NAME: Single Mission Fuel Isolation Valve (SMFIV)

PART NO.: 10201-0122-801 FM CODE: A07
(Alt. for BI109 and BI110,
Mandatory for BI111 and Subs.)

ITEM CODE: 20-01-10A REVISION: Basic

CRITICALITY CATEGORY: 1R REACTION TIME: Seconds

NO. REQUIRED: 2 DATE: April 1, 2001

CRITICAL PHASES: Boost and Separation SUPERCEDES:

FMEA PAGE NO.: A-20L ANALYST: G. Hoskins/S. Finnegan

SHEET 1 OF 3 APPROVED: S. Parvathaneni

FAILURE MODE AND CAUSES: Fail to remain open (Systems A and B) caused by:

- o Electrical short to ground or to return

FAILURE EFFECT SUMMARY: Failure of valves to remain open will result in loss of TVC. Failure of SRB A and B bus power short to ground or return will result in loss of SRB separation, which leads to vehicle break up 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 - ATP-MR A-9480 at vendor's plant and acceptance per criteria of 10SPC-0240.
- 2) Pass - FIV position measurements, B46X1851X, B46X1852X; Bus power voltage measurements: B76V1600C, B76V1601C.
- 3) Pass

RATIONALE FOR RETENTION:

A. DESIGN

- o The Fuel Isolation Valve is designed and qualified in accordance with end item specification 10SPC-0240. (All failure causes)
- o Valve is designed to preclude ignition of Hydrazine due to electrical shorts. (Electrical short circuit)
- o Valve is designed and is tested for 20 valve cycles minimum life (One SRB mission). (All failure causes)
- o Qualification testing verified design requirements as reported in Moog Inc.'s Qualification Test Report MR T-10241. (All failure causes)

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DRD 1.4.2.1-b

B. TESTING

- o Acceptance testing is performed per Moog Inc.'s ATP MR A-9480 on each flight article at vendor's plant. This includes Visual Examination, Electrical Tests, Position Indicator Checks, Performance Checks, and Cleanliness Verification. (All failure causes)
- o Electrical and functional tests are performed per 10REQ-0021, para. 2.3.4.3, and 2.3.15.2. (All failure causes)
- o TVC system functional test is performed during Hot Fire operations per 10REQ-0021, para. 2.3.16. (All failure causes)
- o FIV is functionally tested at bearing soak per OMRSD File V, Vol. 1 Requirement Number B42AP0.080. (All failure causes)
- o APU BITE resistance test B42AP0.050 and frequency test B42AP0.060 per OMRSD File V, Vol. I provides confidence that the coil assembly of the fuel isolation valve is not degraded. (Electrical Open Circuit)

The above referenced OMRSD testing is performed every flight.

C. INSPECTION

I. VENDOR RELATED INSPECTION

- o Verification that material certifications meet the requirements called for on drawings and USA-SRB Element Purchase Order by USA SRBE PQAR per SIP 1511. (All Failure Causes)
- o Verification that all sealing surfaces have been inspected and accepted by Moog for dimensional and surface finish requirements and no damage to surface by USA SRBE PQAR per SIP 1511. (All Failure Causes)
- o Verification of data and supplier acceptance of the following by USA SRBE PQAR. (All Failure Causes)
 - Solder Joints – SIP 1511
 - Cure Data of Diode Board Encapsulation and Coil Assembly – SIP 1511
- o Perform inspection to drawing requirements by USA SRBE PQAR per SIP 1511. (All Failure Causes)
- o Witness acceptance testing in which measurements and/or readings are manually taken and/or recorded for the first two units in each test lot of FIV by USA SRBE PQAR per SIP 1511. Monitor acceptance testing for all other units in each test lot. (All failure Causes).
- o Perform post-ATP final inspection of unit (Ref. ATP MR-9480) by USA SRBE PQAR per SIP 1511. (All Failure Causes)
- o CRITICAL PROCESSES/INSPECTIONS:
 - Solder per NHB5300.4(3A-2) per EP 2856

II. KSC RELATED REFURBISHMENT INSPECTIONS

- o N/A

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Supersedes:

DRD 1.4.2.1-b

III. KSC RELATED ASSEMBLY AND OPERATIONS INSPECTIONS

- o Proper function of TVC system is demonstrated during hotfire per 10REQ-0021, para. 2.3.16. (All failure causes)
- o Verification of proper valve resistance during BITE per OMRSD File V, Vol. 1 Requirement Number B42AP0.050. (All failure causes)
- o FIV is functionally tested at bearing soak per OMRSD File V, Vol. 1 Requirement Number B42AP0.080. (All failure causes)

D. FAILURE HISTORY

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

E. OPERATIONAL USE

- o Not applicable to this failure mode.

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