

~~SSME~~ ~~FA/CIL~~
REDUNDANCY SCREEN

Component Group: Combustion Devices
 CIL Item: A700-03
 Part Number: RS009004
 Component: Oxidizer Preburner
 FMEA Item: A700
 Failure Mode: Blockage of one LOX ASI passage.

Prepared: A. Kay
 Approved: T. Nguyen
 Approval Date: 9/9/99
 Change #: 1
 Directive #: CCBD ME3-01-5239

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Phase	Failure / Effect Description	Criticality Hazard Reference
SMC 4.1	Blockage of one LOX ASI injection passage causes localized LOX-rich operation, erosion of the ASI combustion chamber walls, manifold invasion, injector burnout and aft compartment overpressurization and fire. Loss of vehicle. Redundancy Screens: SINGLE POINT FAILURE: N/A	1 ME-B5S, ME-B6A,C, ME-B6M

SSME FMEA/CIL
DESIGN

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Design / Document Reference

FAILURE CAUSE: A: Contamination of the ASI LOX Injection passage.

THE SMALLEST PORTIONS OF THE ASI OXIDIZER PASSAGEWAY IS LARGER THAN THE ORIFICE INSTALLED, APPROXIMATELY 5 INCHES UPSTREAM (1). ANY CONTAMINANT THAT COULD CAUSE PASSAGE BLOCKAGE WOULD HAVE TO COME FROM THIS SHORT LENGTH OF LINE. HOT FIRE TESTING OF THE ENGINE WILL REVEAL BLOCKAGE PROBLEMS PRIOR TO FLIGHT USE (2). THE ASI ORIFICE IS ASSEMBLED IN A CONTAMINATION CONTROLLED ENVIRONMENT (3).

(1) RS009004, RS009018; (2) RL00050-04; (3) RQ0711-600

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**SSME FM CIL
INSPECTION AND TEST**

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Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
A	ASI ASSEMBLY HOT-GAS MANIFOLD		RS009004 RS007051
	ASI SYSTEM CLEANLINESS	ASI SUBASSEMBLIES AND THE MOV ARE CLEANED DURING MANUFACTURING TO OXYGEN SERVICE REQUIREMENTS. AFTER BRAZING, THE PASSAGE PORTS AND DRIFIDES ARE INSPECTED FOR BLOCKAGE DUE TO BRAZING MATERIAL. DURING THE PROPELLANT CONDITIONING, THE OXIDIZER ASI SYSTEM IS PURGED TO MAINTAIN IT FREE OF MOISTURE AND ICE	RL1001 RA1610-006 RA1607-017 RA1607-018 OMRSD 5007BC.000
	PROPELLANT SYSTEM CLEANLINESS	SSMC PROPELLANT SYSTEMS ARE DRIED AND VERIFIED DRY PRIOR TO EACH FLIGHT.	OMRSD V41CB0 C80 OMRSD V41CB0 C81
	ASSEMBLY INTEGRITY	THE HOT FIRE TESTING AND 2ND E & M INSPECTIONS VERIFY ASI INTEGRITY. ASI CHAMBER IS INSPECTED FOR DAMAGE PRIOR TO EACH LAUNCH. (LAST TEST)	RL00050 (M) RL00056 06 RL00056 07 OMRSD V41BU0 C40

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Failure History: Comprehensive failure history data is maintained in the Problem Reporting database (PRAMS/PRACA)
 Reference: NASA letter SA21499/308 and Rocketdyne letter 88RC39761.
 Operational Use: Not Applicable.

**SSME FMEA/CIL
WELD JOINTS**

Component Group: Combustion Devices
 CIL Item: A700
 Component: RS009004
 Part Number: Oxidizer Preburner
 A700

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Component	Basic Part Number	Weld Number	Weld Type	Class	Root Side Not Access	Critical Initial Flaw Size Not Detectable		Comments
						HCF	LCF	
OPB CHAMBER	RS009003	1,2	GTAW	I	X	X	X	(A050)
OPB CHAMBER	RS009003	1(60DEG)	GTAW	II	X	X	X	(A050)
OPB INJECTOR	RS009004	1	EBW	II	X	X	X	
OPB INJECTOR	RS009004	2	EBW	I	X			
OPB INJECTOR	RS009004	3	GTAW	I	X			
OPB INJECTOR	RS009004	9	EBW	II	X			
OPB INJECTOR	RS009004	28	FBW	II	X			
OPB INJECTOR	RS009004	29	EBW	II	X			
OPB BODY	RS009007	1	GTAW	II	X			(A050)
OPB BODY	RS009007	2	EBW	II	X			(A050)
OPB BODY	RS009007	3	EBW	I				(A050)
OPB BODY	RS009007	4 (OPT)	GTAW	I	X			(A050)
OPB BODY	RS009007	10,11	GTAW	I	X	X	X	(A050)
OPB BODY	RS009007	12	GTAW	I	X		X	(A050)
OPB BODY	RS009007	13	GTAW	I	X	X	X	(A050)
OPB BODY	RS009007	14	GTAW	I	X	X	X	(A050)
OPB BODY	R0018067	1	GTAW	II	X	X	X	
OPB BODY	R0018067	2	EBW	I	X			
OPB BODY	R0018067	6	GTAW	I	X			
OPB BODY	R0018067	7	GTAW	I	X			
OPB FUEL MANIFOLD	RS009013	9(OPT)10 (OPT)	GTAW	I		X	X	(A050)
OPB FUEL MANIFOLD	RS009013	11 (OPT)	GTAW	I		X	X	(A050)
OPB FUEL MANIFOLD	RS009013	13 (OPT)	GTAW	I	X			(A050)
OPB OXID INLET	RS009014	6-8	GTAW	I		X		
OPB LINER	RS009015	2-17	GTAW	II	X			(A050)
OPB ASI FUEL LINE	RS009024	1	GTAW	I	X	X	X	(A050)
OPB CHAMBER	RS009003	3 (OPT) 4 (OPT)	GTAW	I		X	X	(A050)
OPB CHAMBER	RS009003	5 (OPT)	GTAW	I		X	X	(A050)
OPB CHAMBER	RS009003	6 (OPT)	GTAW	I	X			