

SSME FMEA/CIL
REDUNDANCY SCREEN

Component Group: Propellant Valves
CIL Item: D500-05
Component: GOX Control Valve
Part Number: RS01D141
Failure Mode: Structural failure.

Prepared: P. Lowrimore
Approved: T. Nguyen
Approval Date: 6/30/99
Change #: 1
Directive #: CCBP ME3-01-5226
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Phase	Failure / Effect Description	Criticality Hazard Reference
PSMCD 4.1	Loss of pogo suppression flow; overpressurization of aft compartment. Loss of vehicle. Redundancy Screens: SINGLE POINT FAILURE: N/A.	1 ME-C3P,D, ME-C3S, ME-C3M ME-C3A,C

**SSME FAILURE/CIL
DESCRIPTION**

Component Group: Propellant Valves
CIL Item: D508-05
Component: GOX Control Valve
Part Number: RS010141
Failure Mode: Structural failure.

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Design / Document Reference

FAILURE CAUSE: A: Fracture of housing.

THE HOUSING (1) IS MADE FROM INCONEL 718. INCONEL 718 IS USED FOR ITS HIGH STRENGTH, MODULUS OF ELASTICITY, CRYOGENIC TOUGHNESS, CORROSION RESISTANCE AND RESISTANCE TO STRESS CORROSION CRACKING (2). IT MEETS THE STANDARD LOX/GOX COMPATIBILITY REQUIREMENTS (3). THE HOUSING IS HEAT TREATED FOR STRENGTH (1). THE HIGH CYCLE AND LOW CYCLE FATIGUE LIFE OF THE GCV MEETS CEI REQUIREMENTS (4). THE MINIMUM FACTORS OF SAFETY FOR THE GCV MEET CEI REQUIREMENTS (5). THE GCV WAS CLEARED FOR FRACTURE MECHANICS/DE FLAW GROWTH, SINCE IT CONTAINS NO FRACTURE CRITICAL PARTS (6). THE GOX CONTROL VALVE HAS COMPLETED DVS TEST REQUIREMENTS (7), INCLUDING VIBRATION (8), AND ENDURANCE (9).

(1) RS010142; (2) RSS-8582; (3) RL10017; (4) RL00532, CP320R0003B; (5) RSS-8546, CP320R0003B; (6) NASA TASK 117; (7) DVS-SSME-517; (8) RSS-517-40, RSS-517-60; (9) RSS-517-50

**SSME FMEA/CIL
INSPECTION AND TEST**

Component Group: Propellant Valves
 CIL Item: D500-05
 Component: GOX Control Valve
 Part Number: RS010141
 Failure Mode: Structural failure.

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Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
A	HOUSING		RS010142
	MATERIAL INTEGRITY	MATERIAL INTEGRITY IS VERIFIED PER SPECIFICATION REQUIREMENTS.	RB0170-153
		HOUSING IS PENETRANT INSPECTED AFTER FINISH MACHINING AND HEAT TREAT.	RA0115-116
		HOUSING HEAT TREAT IS VERIFIED PER SPECIFICATION.	RA0611-020
		ASSEMBLY CHECKOUT, PROOF, AND FUNCTION TEST VERIFIES HOUSING INTEGRITY.	RL00490
	HOT-FIRE ACCEPTANCE TESTING (GREEN RUN)	VALVE OPERATION IS VERIFIED THROUGH HOT-FIRE ACCEPTANCE TESTING.	RL00461
		SIGNATURE LEAK TEST PERFORMED PRIOR TO EACH LAUNCH VERIFIES NO EXTERNAL LEAK OR RUPTURE OF GCV CHECK VALVE CAVITY. (LAST TEST)	OMRSD S00000 950

Failure History: Comprehensive failure history data is maintained in the Problem Reporting database (PRAMS/PACA)
 Reference: NASA letter SA21/88/308 and Rocketdyne letter 88RC09761.
 Operational Use: Not Applicable.

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SSME FMEA/CIL
WELD JOINTS

Component Group: Propellant Valves
 CIL Item: D500
 Component: GOX Control Valve
 Part Number: RS010141

Prepared: P. Lowmore
 Approved: T. Nguyen
 Approval Date: 6/30/99
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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	
GOX CONTROL VALVE	RS010141	1	EBW	II	X	X		
GOX CONTROL VALVE	RS010141	2	EBW	II	X			
GOX CONTROL VALVE	RS010141	3,4	EBW	II	X	X		
BELLOWS	RS010143	3,4	GTAW	II	X			
BELLOWS	RS010143	5,6	EBW	II	X	X		