

Failure Modes and Effects Analysis/Critical Items List

Document Number: JSC-38378 Document Rev. No.: C Document Date: 8/26/97
 Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: Lines and Fittings Qty: N/A FMEA Number: US-SFR-010
 Item Part Number: N/A ORU Name: SAFER
 Subsystem Name: Propulsion ORU Part Number: SED33105900-311
 Function: Provides plumbing to SAFER propulsion system components.

Item Type Designator: C PG/IP Identifier: N/A
 Reference Designator/Find No.: N/A Drawing Number: SED33105900
 Logistics Control Number: N/A

End Item Name: SAFER
 End Item Capability: Six degrees of freedom through 24 thrusters, each rated at 0.8 ± 0.08 lbs. force in vacuum.
 End Item Function: Provides emergency EVA self-rescue for separated crewmember.
 ISS Zone: EVA Shuttle Zone: EVA

Criticality

Critical Item: Yes: _____ No: X Criticality Category: ISS: 1R Shuttle: 1R/3
 Success Paths: Success Paths Remaining:

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: External leakage of GN₂.
 Failure Mode Code:
 Failure Cause: Defective material, defective weld, defective o-rings, contamination/corrosion, failed component.
 Failure Detection:
 Flight: IVA – IVA checkout, high-pressure system only.
 EVA – Thrust response will degrade. LCD will display pressure drop with a flashing tank pressure message. The message "Excessive Leak" will be displayed.
 Ground: Functional Test.
 Time To Detect Quantity: 1 Time To Detect Units: Second
 Correcting Action: None.
 Remarks: Includes service ports, mechanical fittings to the pressure system components (tank, isolation valves, regulator, pressure relief valve, flex hoses, and thrusters).
 Stabilization of SAFER (AAH) and maneuver capability may be available, depending on the rate of GN₂ loss.
 Failure Effect Phase: EVA Operations Affected Stage(S): EVA Operations

Failure Effect

On ORU/Assembly:
First/Second Failure: Inadvertent EVA crewmember separation.
Third (this) Failure: Loss/reduction of GN₂ flow to thrusters. Crewmember is unable to change previous motion.
 On Subsystem/Next Assembly: Depletion of GN₂ tank
 On End Item/Segment: Prevents self rescue
 On Crew/ISS: Possible loss of EVA crewmember
 Time To Effect Quantity: 1 Time To Effect Units: Minutes

Redundancy Screen

ISS	(Shuttle)		
Checkout Pre-Launch	(A):	Pass	
Checkout On-Orbit	(B):	Pass (High-pressure system only)	
Detection Flight Crew:		Pass	Or
Loss Of Redundancy From A Single Cause	(C):	N/A	Detection Ground Crew: Fail