

CRITICAL ITEMS LIST (CIL)

No. 10-03-01-01/03

SYSTEM:	Space Shuttle RSRM 10	CRITICALITY CATEGORY:	1
SUBSYSTEM:	Ignition Subsystem 10-03	PART NAME:	SRM Ignition Initiator (1)
ASSEMBLY:	SRM Ignition Initiator 10-03-01	PART NO.:	(See Table A-3)
FMEA ITEM NO.:	10-03-01-01 Rev M	PHASE(S):	Boost (BT)
CIL REV NO.:	M	QUANTITY:	(See Table A-3)
DATE:	31 Jul 2000	EFFECTIVITY:	(See Table 101-6)
SUPERSEDES PAGE:	407-1ff.	HAZARD REF.:	BI-01
DATED:	30 Jul 1999		
CIL ANALYST:	S. E. Rodgers		
APPROVED BY:		DATE:	
RELIABILITY ENGINEERING:	<u>K. G. Sanofsky</u>		<u>31 Jul 2000</u>
ENGINEERING:	<u>J. W. Edwards</u>		<u>31 Jul 2000</u>

- 1.0 FAILURE CONDITION: Failure during operation (D)
- 2.0 FAILURE MODE: 1.0 Structural failure
- 3.0 FAILURE EFFECTS: Failure of the structure will cause loss of the RSRM, SRB, crew, and vehicle
- 4.0 FAILURE CAUSES (FC):

FC NO.	DESCRIPTION	FAILURE CAUSE KEY
1.1	Nonconforming dimensions	A
1.2	Nonconforming materials or heat treat	B
1.3	Header leakage/blowout	C
1.4	Improper installation	D
	1.4.1 Damaged threads	E
	1.4.2 Improper torque	F
	1.4.3 Improper thread engagement	G
1.5	Improper standard ignition initiator charge	H
1.6	Shock and vibration	I
1.7	Cracks or other material defects	J

5.0 REDUNDANCY SCREENS:

SCREEN A: N/A  
SCREEN B: N/A  
SCREEN C: N/A

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6.0 DESCRIPTION:

- Each RSRM igniter assembly has two SRM Ignition Initiators (SIIs). The SIIs have a unibody design, meaning the body is one piece. The sealing surface is built into the part. There is no sealing washer. Each SII is a small electro-explosive device (EED) that initiates the ignition process in the RSRM. It is shown in Figures 1 and 2. Materials are listed in Table 1.

TABLE 1. MATERIALS

Drawing No.	Name	Material	Specification	Quantity
SED26100107	Initiator, SRM Ignition (SII)	Inconel 718 Stainless Steel		2/Motor (Body Only)
1U77386	Barrier-Booster Assembly, S/A Device, Loaded			1/Motor

6.1 CHARACTERISTICS:

- The SIIs are Government Furnished Equipment (GFE). They have a unibody design that allows for greater flatness control. The ignition of the SIIs is the first step in the motor ignition process. They ignite the following in turn; pyrotechnic basket, initiator, igniter and finally the motor. The SII closure cup protects the SII from humidity prior to ignition and the header seals the SII after ignition.

7.0 FAILURE HISTORY/RELATED EXPERIENCE:

- Current data on test failures, flight failures, unexplained failures, and other failures during RSRM ground processing activity can be found in the PRACA Database.

8.0 OPERATIONAL USE: N/A

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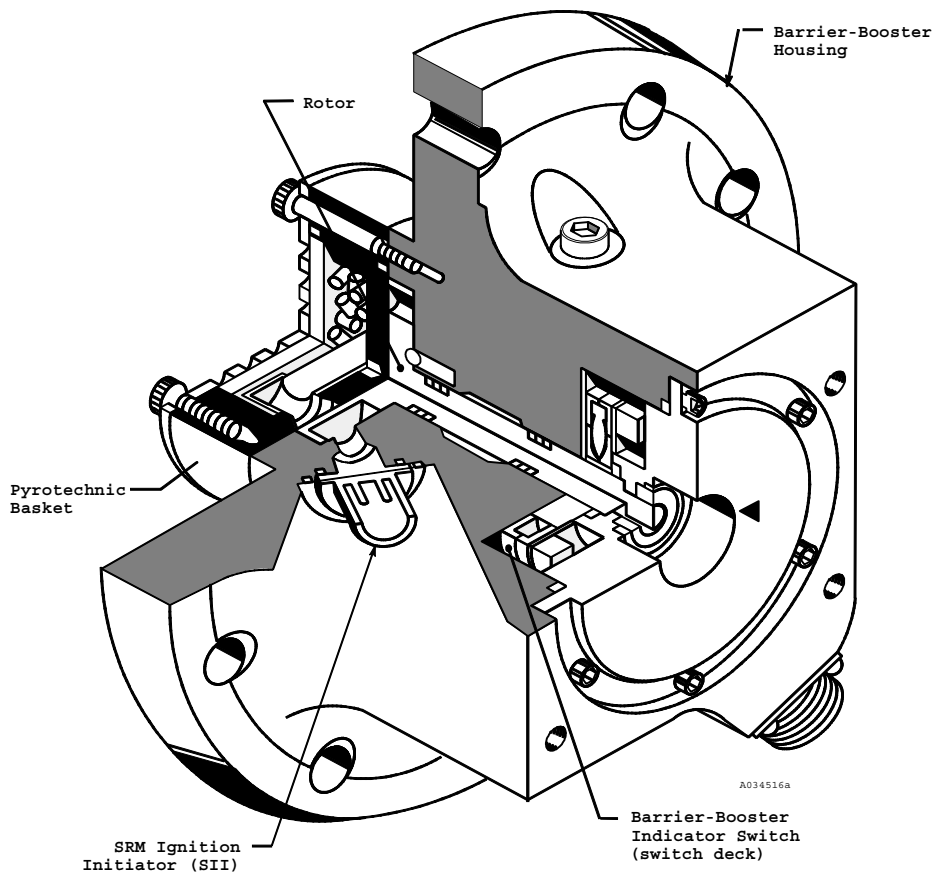


Figure 1. Barrier-Booster Assembly

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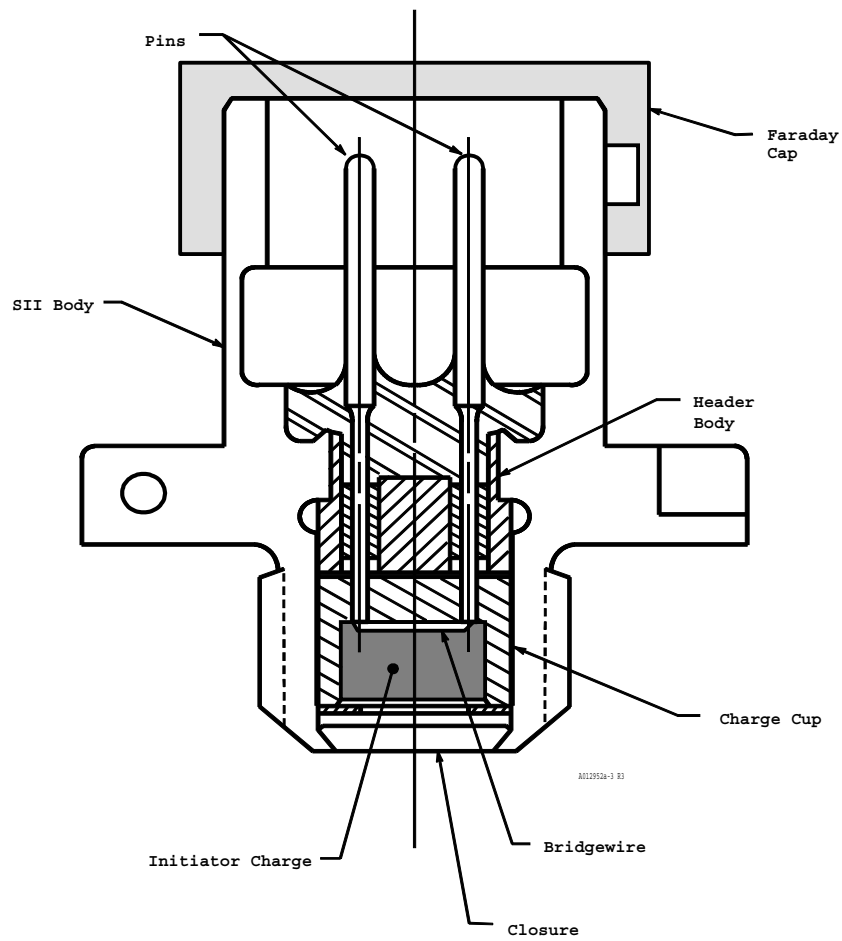


Figure 2. SRM Ignition Initiator (SII)

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9.0 RATIONALE FOR RETENTION:

9.1 DESIGN:

DCN FAILURE CAUSES

- |                         |     |  |
|-------------------------|-----|--|
| A,B,C,D,E,<br>F,G,H,I,J | 1.  | The SII is GFE. Its design is controlled by JSC, and design characteristics that minimize the probability of failures related to the cause are addressed in the JSC Critical Items List. |
| A,B,C,D,E,<br>F,G,H,I,J | 2.  | Qualification of the SII is controlled by JSC, and qualification testing and/or analysis related to the failure cause is addressed in the JSC Critical Items List.                       |
| A,B,C,J                 | 3.  | Header and body assemblies are hydrostatic tested and pressurized per JSC engineering.   |
| B,D,E,F,G               | 4.  | The material for the SII body and threads is Inconel 718 per JSC engineering.  |
| C,J                     | 5.  | The SII header is designed and hermetically sealed per JSC engineering.  |
| D,E,F,G                 | 6.  | Thiokol installs a lightly lubricated O-ring on the initiator, and then installs the SII into threaded holes in Barrier-Booster Assembly per engineering drawings and shop planning.     |
| D,E,F,G                 | 7.  | The SII is installed per JSC specifications.   |
| D,E,F,G                 | 8.  | The SII is designed to withstand torque per engineering drawings.  |
| H                       | 9.  | The amount and type of material that constitutes the charge is per JSC engineering.  |
| I                       | 10. | Shock and vibration environments, including pre-launch random vibration, to which the SII is exposed are the same as for the S&A device, and are per engineering.                        |
| I                       | 11. | Shock and vibration levels to which the SII is exposed during pre-launch are lower than the SII design and qualification shock and vibration levels per TWR-18147.                       |

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9.2 TEST AND INSPECTION:

<u>DCN</u>	<u>FAILURE CAUSES and TESTS (T)</u>	<u>CIL CODES</u>
A,B,C,D,E, F,G,H,I,J	1. Vendor inspections of this GFE item which minimize the probability of failures related to the cause listed above are controlled by JSC, and should be addressed in the JSC Critical Items List.	
	2. For New SRM Ignition Initiator (SII), verify:	
A,B,C,D,E, F,G,H,I (T) D,E,F,G,J D,E,F,G,J	a. Lot of SIIs was flight-certified	RAA040
	b. SII is free of obvious shipping or handling damage	AKP001
	c. Sealing surface is free of damage such as nicks, dings, scratches, or raised metal	RAA128
	3. For New Barrier-Booster Assembly, Loaded, verify:	
D,E,F,G	a. Initiators properly torqued per specification	ADA058
	4. KSC verifies:	
A,B,C,D,E, F,G,H,I	a. SIIs were flight-certified by JSC per OMRSD File V, Vol I, B000FL.002	OMD021
C	b. S&A device for the following per OMRSD File V, Vol I, B000FL.001:	OMD020
(T)	1. Bridge wire resistance test results are acceptable	
(T)	2. Insulation-resistance test are acceptable	
	3. General condition including Faraday caps for damage and absence of contamination	