T10/SNA--236

C002-DS090270-F1
ENGINEERING DESIGN SHEET SPECIFICATION

PERFORMANCE/DESIGN AND
PRODUCT CONFIRMATION REQUIREMENTS

FOR

SHIELD SPACER

FORMING A PART OF
CEI NUMBER 090290A

PRELIMINARY PROPOSAL ISSUE
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MASTER

AEROJET-GENERAL CORPORATION

SACRAMENTO, CALIFORNIA

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PERFORMANCE/DESIGN AND QUALIFICATION REQUIREMENTS

for

SHIELD SPACER

Replace page(s) with the latest revised page(s) noted below. Revised paragraph(s) are identified with the latest revision letter (or number) in the margin.

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1. SCOPE

1.1 Scope.- This specification establishes the performance, design, test and qualification requirements for equipment identified as Shield Spacer. It is a part of the subsystem described as thrust structure subsystem and is listed as a design critical component in detail specification EC-90152.

2. APPLICABLE DOCUMENTS

2.1 Aerojet-General Corporation Documents.- The following documents, of the latest issue, form a part of this specification to the extent specified herein. In the event of conflict between documents referenced herein and other detailed content of Sections 3, 4, 5, and 10, the detailed requirements of Sections 3, 4, 5, and 10 shall be considered a superseding requirement.

SPECIFICATIONS

EC-90152	Thrust Structure Subsystem
EC-90243	External Shield Subsystem
CP-90290	Engine NERVA 75K Full Flow

DRAWINGS

1136390	75K NERVA Flight Engine-Full Flow Concept

(Copies of above documents required by suppliers in connection with specific procurement functions should be obtained from the procuring activity.)

3. REQUIREMENTS

3.1 Performance.- Except as otherwise specified herein, performance requirements for this equipment shall be in accordance with EC-90152 of which this equipment is a part. The Shield Spacer shall be capable of performing as specified herein within the environmental conditions specified in 3.1.2.4.

3.1.1 Functional Characteristics.- The shield spacer shall transmit thrust and/or inertia loads between the lower thrust structure and the middle thrust structure.

3.1.2 Operability.-

3.1.2.1 Reliability.- The probability that this component shall successfully fulfill its operating requirements shall be a minimum of 0.999999.

3.1.2.2 Maintainability.- As specified in EC-90152.

3.1.2.3 Useful Life.- As specified in EC-90152.

3.1.2.4 Environmental.- The shield spacer shall be subjected to the natural environments in CP-90290 in addition to the following induced environments.

- (a) Nuclear Radiation - As specified in Table I
- (b) Acceleration, Vibration and Shock - As specified in Table II
- (c) Acoustic - As specified in Table II

3.1.2.5 Transportability.-

3.1.2.5.1 Shipping.- As specified in EC-90152 and as follows: The shield spacer shall be transportable as an individual component in any attitude by land, sea, or air shipment.

3.1.2.5.2 Handling.- As specified in EC-90152.

3.1.2.6 Human Performance.- Not applicable.

3.1.2.7 Safety.- As specified in EC-90152.

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3.2 CEI Definition.- Not applicable.

3.3 Design and Construction.- Except as otherwise specified herein, design and construction of this equipment shall be in accordance with EC-90152 of which this equipment is a part.

3.3.1 General Design Features.-

3.3.1.1 Configuration.- The shield spacer configuration envelope shall either conform identically or within the envelope of the external shield as specified in EC-90243. The shield spacer shall be interchangeable with the External Shield Subsystem without affecting engine assembly axial stationing.

3.3.1.2 Structural Criteria.- As specified in EC-90152.

3.3.1.3 Physical Properties.- The weight of the shield spacer shall not exceed 200 pounds.

3.3.1.4 Structural Stiffness.- Structural stiffness of the shield spacer when combined with the upper, middle and lower thrust structures and gimbal assembly subsystem shall meet the requirements specified in EC-90152.

3.3.2 Selection of Specifications and Standards.- As specified in EC-90152.

3.3.3 Materials, Parts, and Processes.- As specified in CP-90290.

3.3.4 Standard and Commercial Parts.- As specified in CP-90290.

3.3.5 Moisture and Fungus Resistance.- As specified in CP-90290.

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3.3.6 Corrosion and Metal Parts.- As specified in CP-90290.

3.3.7 Interchangeability and Replaceability.- As specified in CP-90290 and as follows: The shield spacer shall be dimensionally interchangeable with the external shield specified in EC-90243.

3.3.8 Workmanship.- As specified in CP-90290.

3.3.9 Electromagnetic Interference.- Not applicable.

3.3.10 Identification and Marking.- As specified in CP-90290.

3.3.11 Storage.- The Shield Spacer shall be capable of performing as specified herein subsequent to storage while protected from the ground environmental conditions specified in 3.1.2.4 for a period not exceeding the ground storage life specified in 3.1.2.3.

TABLE I
INDUCED NUCLEAR RADIATION

<u>Description</u>	<u>Location</u>		<u>Flight*</u>		<u>Ground Engine</u>	
	<u>Sta</u>	<u>R</u>	<u>Gamma Kerma</u>	<u>Fast Neutron</u>	<u>Gamma Kerma</u>	<u>Fast Neutron</u>
			<u>Rate</u> <u>Rads/Hr</u>	<u>Flux</u> <u>N/cm²-sec</u>	<u>Rate</u> <u>Rads/Hr</u>	<u>Flux</u> <u>n/cm²-sec</u>
Spacer/MTS	82.7	38	5.9×10^6	1.8×10^{11}	7.3×10^6	2.2×10^{11}
Spacer/MTS	82.7	44	9.0×10^6	2.4×10^{11}	1.0×10^7	2.8×10^{11}
Spacer/LTS	92.7	38	8.4×10^6	2.4×10^{11}	9.8×10^6	2.8×10^{11}
Spacer/LTS	92.7	44	1.4×10^7	4.5×10^{11}	1.5×10^7	4.9×10^{11}

*No external shield, unperturbed

TABLE II
INDUCED DYNAMICS ENVIRONMENT

<u>Mode</u>	<u>Acceleration, g's</u>		<u>Vibration, g's</u>		<u>Shock</u>	<u>Acoustic</u>
	<u>Axial</u>	<u>Lateral</u>	<u>Axial</u> 3 - 35 Hz	<u>Lateral</u> 0.1 - 15 Hz		
(a) Launch	5.2	± 1.0	± 4.5	± 3.0		As specified in CP-90290
(b) Operation						

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