

PROTOFLIGHT ENVIRONMENTS
FOR
INMARSAT 3 PROPELLANT TANK ASSEMBLY
ATK P/N 80364-1

80364-1 was subjected to the following protoflight tests:

<u>Test Sequence</u>	<u>Test Description</u>	<u>Pa</u>
1.	Pre-Assembly Inspections and Tests	
	A) Forging Quality Inspection	
	B) Surface Quality Inspection	
	C) Wall Thickness Inspection	
2.	Examination of Product	
3.	Volumetric Capacity Test - Pre Proof	
4.	Proof Pressure Test - Room Temp.	
5.	Volumetric Capacity Test - Post Proof	
6.	External Leakage Test	
7.	Vibration Tests	
	A) Sine Sweep	
	B) Sine Vib	
	C) Sine Sweep	
	D) Random Vib	
	E) Sine Sweep	
8.	External Leak Test	
9.	Outside Surface Qual. Insp. (Dye Penetrant)	
10.	Weld Qual. Insp. (X-Ray)	
11.	Weight Test	
12.	Examination of Product	
13.	Pressurant Tube Weld Qual. Insp.	
14.	Cleanliness Test	
15.	Final Tank Assembly Insp.	

Vibration Tests

The tank is loaded with 156, +10/-0 psig with water, and pressurized to 400, +10/-0 psig with gaseous nitrogen.

Signature Sine Sweep

Sine sweep is conducted at 0.25G from 5 to 2000 Hz at 4 octaves/min.

Sine Vibration (Wet)

Sinusoidal Vibration - Conduct the sinusoidal sweep at 4 octaves per minute at the following levels (required for protoflight test only!):

<u>Test Axis</u>	<u>Frequency (Hz)</u>	<u>Input Level</u>	<u>Response G Limit**</u>
"X" (Thrust)	5 - 14	0.5 (D.A.)*	
	14 - 25	5.0 G peak	12.5 G
	25 - 65	11.0 G peak	(5 to 100 Hz)
	65 - 100	1.5 G	
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"Y" and "Z" (Lateral)	5 - 13	0.5 (D.A.)*	
	13 - 70	4.5 G peak	12.5 G
	70 - 100	1.0 G peak	(5 to 100 Hz)

* Limited to 0.5 inch maximum double amplitude.

** The input level shall be notched when responses are exceeding limits defined. The G limit shall be set at levels specified for all three directions and activated during test.

*** TRW PSI to verify specified input levels versus graph levels prior to actual vibration run.

Record data on Data Sheet "F".

Signature Sine Sweep

Sine sweep is conducted at 0.25G from 5 to 2000 Hz at 4 octaves/min.

Vibration Tests (continued)

Random Vibration (Wet)

Random Vibration - Conduct random vibration with input spectrum defined as follows (PSD tolerance +/-3.0 dB):

<u>Frequency (Hz)</u>	<u>PROTOFLIGHT (3 AXES) PSD (G²/Hz)</u>	<u>ACCEPTANCE (2 AXES ONLY) ("X" and "Y") PSD (G²/Hz)</u>
20 - 90	+3.00 dB/Oct	+3.00 dB/Oct
90 - 160	0.030	0.012
160 - 200	+6.90 dB/Oct	+6.90 dB/Oct
200 - 400	0.050	0.020
400 - 2000	-3.00 dB/Oct	-3.00 dB/Oct

A full level random vibration test for 15 seconds using the input spectrum.

Signature Sine Sweep

Sine sweep is conducted at 0.25G from 5 to 2000 Hz at 4 octaves/min.