

QUALIFICATION ENVIRONMENTS
FOR
POSITIVE EXPULSION PROPELLANT TANK
ATK P/N 80290-1

Table 1: P/N 80290-1 Positive Expulsion Propellant Tank Specifications

Parameters	Requirements
Operating Pressure	396 psig
Proof Pressure	594 psig, Actual Proof: psig
Burst Pressure	792 psig, Actual Burst: No Data Found
External Pressure	Not tested
Internal Vacuum	Not tested
Material of Construction	Spherical Pressure Vessel constructed of 6AL-4V titanium. Fluid connections are made thru .187 inch outside diameter titanium tubes equipped with Swagelok type connections.
Membrane Thickness	0.021"
Tank Mount(s)	Mounting is provided by lugs parallel with and adjacent to the mid-plane.
Expulsion Efficiency	99.8%
Design Fill Fraction	-
Tank Capacity	1080 in ³
Internal Dimensions	13.50" Ø
Tank Weight	Maximum tank weight is 5.6 lbs, Actual tank weight is 2.899 lbs
Propellant Capacity	-
Shell Leakage	<1x10 ⁻⁶ std cc/sec He max, Actual: No Leakage
Failure Mode	Burst
Natural Frequency	-
Temperature Environment	-
On Orbit Life	-

80290-1 was subjected to the following qualification tests:

<u>TEST SEQUENCE</u>	<u>TEST DESCRIPTION</u>
1	ACCEPTANCE TEST
2	VIBRATION
3	EXPULSION EFFICIENCY
4	INTERNAL (DIAPHRAGM) LEAKAGE
5	EXTERNAL LEAKAGE

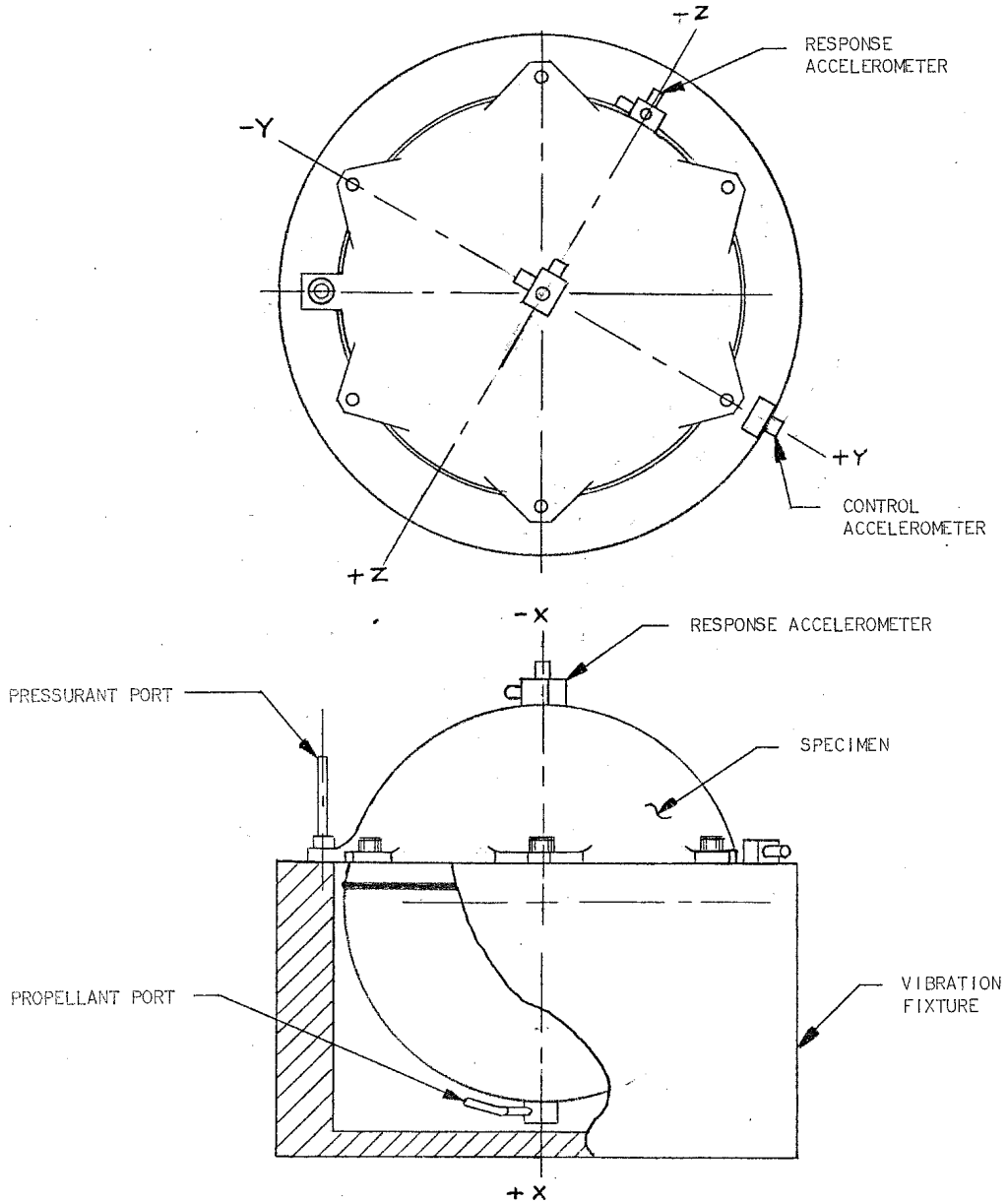
The following tests are listed in this report:

- 1) Random Vibration Test
- 2) Sine Vibration Test

NO BURST TEST PERFORMED

Vibration Test Set-Up

FIGURE NO. 1
VIBRATION TEST SET-UP



Random Vibration Data

RANDOM VIBRATION DATA

EXCITER No. C210

<u>AXIS</u>	<u>PLOT No.</u>	<u>FREQUENCY</u>	<u>POWER SPECTRAL DENSITY LEVEL</u>	<u>ROLL-UP dB/OCT</u>	<u>ROLL-OFF dB/OCT</u>	<u>ACCELERATION LEVEL</u>	<u>DURATION</u>
"y"	55	20 - 330 Hz	.008 G ² /Hz	---	---	11.8 GRMS	180 SECONDS
"y"		300 - 1320 Hz	---	+ 6	---		
"y"		1320 - 2000 Hz	.128 G ² /Hz	---	---		
"z"	7	20 - 330 Hz	.008 G ² /Hz	---	---	11.8 GRMS	180 SECONDS
"z"		330 - 1320 Hz	---	+ 6	---		
"z"		1320 - 2000 Hz	.128 G ² /Hz	---	---		
"x"	9	20 - 330 Hz	.008 G ² /Hz	---	---	12.07 GRMS	180 SECONDS
"x"		330 - 1320 Hz	---	+ 6	---		
"x"		1320 - 2000 Hz	.128 G ² /Hz	---	---		

TEST SPECIMEN LOAD = 27.5 LBS OF DISTILLED/DEIONIZED WATER

TEST SPECIMEN PRESSURE = 400 PSIG OF NITROGEN GAS

Random Vibration (Wet)



PSI TEST REPORT No. 56-000086
APPENDIX "C", PAGE C-3

DATA SHEET "A"
RANDOM VIBRATION

DATE: 4-8 To 4-9

PSI PART No. 80290-1

PSI SERIAL No. 0001

TEST EQUIPMENT RANDOM CONSOLE

HYDRAZINE
PSI PART NAME: SUPPLY TANK

Gauge, Pressure, Ashcroft 0-600 PSIG no. ST-6334 CALIB DUE 7-5-8

		REQUIREMENT		ACTUAL			
WEIGHT OF WATER IN SPECIMEN:		27.5 ± .5 POUNDS		<u>27.5 LBS</u>			
SPECIMEN PRESSURE:		396, +10, -0 PSIG		<u>400 PSIG</u>			
FASTENER TORQUE:		70 +5, -5 INCH LBS		<u>75 INCH LBS.</u>			

*AXIS	FREQUENCY		G RMS	G ² /Hz	DB/OCT ROLL UP	DB/OCT ROLL OFF	RUN TIME
	FROM	TO					
<u>Z</u>	<u>20</u>	<u>330</u>	<u>.11.8</u>	<u>1008</u>	<u>-</u>	<u>-</u>	<u>3 MIN</u>
	<u>330</u>	<u>1320</u>		<u>-</u>	<u>6</u>	<u>-</u>	
	<u>1320</u>	<u>2000</u>		<u>.128</u>	<u>-</u>	<u>-</u>	

* USE A SEPARATE DATA SHEET FOR EACH AXIS.

DATE	TIME	LOG ENTRIES
<u>4-9-81</u>	<u>0845</u>	<u>RANDOM RUN</u>

TESTED BY David W. Schust DATE 4-9-81 SPECIMEN PASSED Yes

Sine Vibration Data

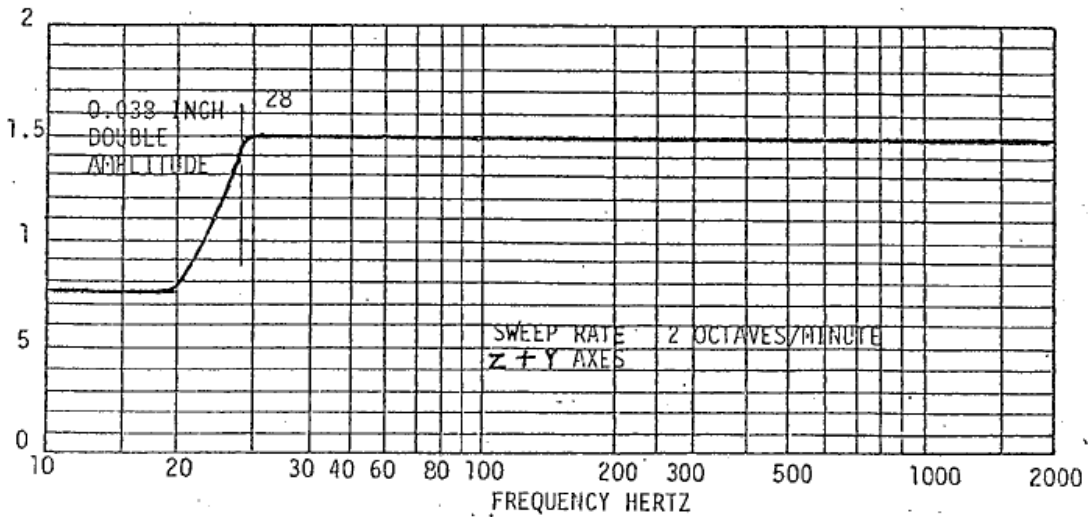
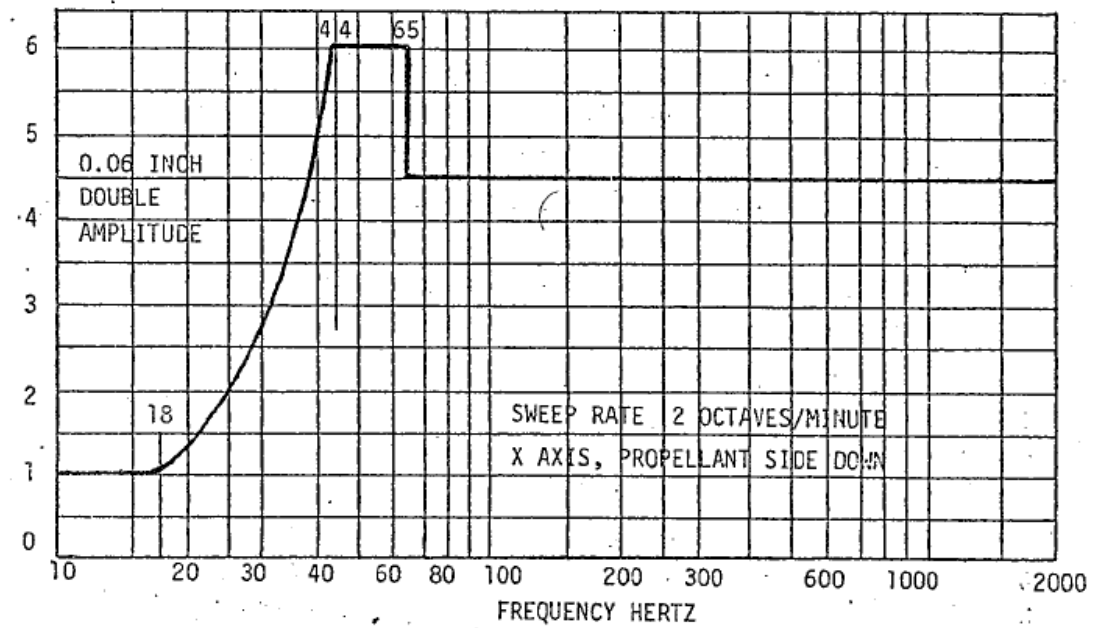
SINUSOIDAL VIBRATION DATA

EXCITER No. C210

<u>AXIS</u>	<u>PLOT No.</u>	<u>FREQUENCY</u>	<u>DISPLACEMENT D.A.</u>	<u>ACCELERATION LEVEL</u>	<u>SWEEP RATE</u>	<u>DURATION</u>
"Y"	1	10 - 20 Hz	—	.75 G's PK	2.0 OCTAVES	3.6 MINUTES
"Y"		20 - 28 Hz	.038"	—		
"Y"		28 - 2000 Hz	—	1.50 G's PK		
"Z"	2	10 - 20 Hz	—	.75 G's PK	2.0 OCTAVES	3.6 MINUTES
"Z"		20 - 28 Hz	.038"	—		
"Z"		28 - 2000 Hz	—	1.50 G's PK		
"X"	3	10 - 18 Hz	—	1.0 G's PK	2.0 OCTAVES	3.6 MINUTES
"X"		18 - 44 Hz	.060"	—		
"X"		44 - 65 Hz	—	6.0 G's PK		
"X"		65 - 2000 Hz	—	4.5 G's PK		

Sine Vibration (Wet)

SINUSOIDAL VIBRATION LEVELS



Tank is loaded with 27.5 ± 0.5 lbs of distilled, deionized water and pressurized to 396, +10/-0 psig.

DATA SHEET "B"
SINUSOIDAL VIBRATION

DATE: 4-8-4-9

PSI PART No. 80290-1

PSI SERIAL No. 000 /

HYDRAZINE

PSI PART NAME: SUPPLY TANK

TEST EQUIPMENT _____


Gauge, Pressure, Ashcroft 0-600 psig no 5T-0334 Calib Due 7-5-81

	REQUIREMENT	ACTUAL
WEIGHT OF WATER IN SPECIMEN:	27.5 ± .5 POUNDS	<u>27.5 LBS.</u>
SPECIMEN PRESSURE:	396, +10, -0 PSIG	<u>400 PSIG</u>
FASTENER TORQUE:	70, +5, -5 INCH LBS	<u>75 INCH LBS.</u>

*AXIS	FREQUENCY		D. A.	G PEAK	SWEEP RATE MINUTES/OCTAVE	DURATION TOTAL MINUTES
	FROM	TO				
X	10	18	-	1.0	<u>2 OCT / MIN</u>	<u>3.6</u>
	18	44	.06			
	44	65		6.0		
	65	2000		4.5		

* USE A SEPARATE DATA SHEET FOR EACH AXIS.

DATE	TIME	LOG ENTRIES
<u>4-9-81</u>	<u>1510</u>	<u>SRNE Sweep</u>

TESTED BY New Schuster  DATE 4-9-81 SPECIMEN PASSED _____

DATA SHEET "B"
SINUSOIDAL VIBRATION

DATE: 4-8 To 4-9

PSI PART No. 80290-1

PSI SERIAL No. 0001

HYDRAZINE

TEST EQUIPMENT _____ PSI PART NAME: SUPPLY TANK


GAUGE, PRESSURE, ASHCROFT 0-600 PSIG NO. ST-0334 CALIB DUG 7-5-81

		REQUIREMENT			ACTUAL	
WEIGHT OF WATER IN SPECIMEN:		27.5 ± .5 POUNDS			<u>27.5 LBS.</u>	
SPECIMEN PRESSURE:		396, +10, -0 PSIG			<u>400 PSIG</u>	
FASTENER TORQUE:		70, +5, -5 INCH LBS			<u>75 INCH LBS</u>	

*AXIS	FREQUENCY		D. A.	G PEAK	SWEEP RATE MINUTES/OCTAVE	DURATION TOTAL MINUTES
	FROM	TO				
Y	10	20	-	.75	2 OCT/MIN	3.6
	20	28	.038	-		
	28	2000	-	1.5		

* USE A SEPARATE DATA SHEET FOR EACH AXIS.

DATE	TIME	LOG ENTRIES
4-8	1415	Y AXIS SINE SWEEP

TESTED BY Daniel W. Schuster  DATE 4-8-81 SPECIMEN PASSED

DATA SHEET "B"
SINUSOIDAL VIBRATION

DATE: 4-8th 4-9

PSI PART No. 80290-1

PSI SERIAL No. 0001

HYDRAZINE
PSI PART NAME: SUPPLY TANK

TEST EQUIPMENT _____


Gauge, Pressure, Ashcroft 0-600 PSIG NO. ST-0334 CALIB DUE 7-5-81

	REQUIREMENT	ACTUAL
WEIGHT OF WATER IN SPECIMEN:	27.5 ± .5 POUNDS	<u>27.5 LBS.</u>
SPECIMEN PRESSURE:	396, +10, -0 PSIG	<u>400 PSIG</u>
FASTENER TORQUE:	70, +5, -5 INCH LBS	<u>75 INCH LBS</u>

*AXIS	FREQUENCY		D. A.	G PEAK	SWEEP RATE MINUTES/OCCTAVE	DURATION TOTAL MINUTES
	FROM	TO				
<u>Z</u>	<u>10</u>	<u>20</u>	<u>-</u>	<u>.75</u>	<u>2 OCT/MIN</u>	<u>3.6</u>
	<u>20</u>	<u>28</u>	<u>.038</u>	<u>-</u>		
	<u>28</u>	<u>2000</u>	<u>-</u>	<u>1.5</u>		

* USE A SEPARATE DATA SHEET FOR EACH AXIS.

DATE	TIME	LOG ENTRIES
<u>4-9-81</u>	<u>0925</u>	<u>SINE SWEEP</u>

TESTED BY Daniel W. Schuster  DATE 4-8-81 SPECIMEN PASSED _____

