

**QUALIFICATION ENVIRONMENTS**  
**FOR**  
**PROPELLANT TANK ASSEMBLY**  
**ATK P/N 80276-1**

MISSING DATA!

**Table 1: P/N 80276-1 Propellant Tank Assembly Specifications**

<b>Parameters</b>	<b>Requirements</b>
Operating Pressure	320 psig
Proof Pressure	478 psig, Actual Proof: psig
Burst Pressure	682 psig, Actual Burst: psig,
External Pressure	
Internal Vacuum	Not tested
Material of Construction	Light spherical titanium 6AL-4V pressure vessel, with two ports.
Membrane Thickness	"
Tank Mount(s)	Mounting is accomplished by a base mount located on the dome of the propellant hemisphere.
Expulsion Efficiency	%
Design Fill Fraction	-
Tank Capacity	2300 in <sup>3</sup>
Internal Dimensions	16.50" Ø
Tank Weight	Maximum tank weight is 9.03 lbs, Actual tank weight is lbs
Propellant Capacity	1827 in <sup>3</sup>
Shell Leakage	<1x10 <sup>-6</sup> std cc/sec He max, Actual: none
Failure Mode	Burst
Natural Frequency	-
Temperature Environment	-
On Orbit Life	-

**80276-1 was subjected to the following qualification tests:**

<u>TEST SEQUENCE NUMBER</u>	<u>TEST DESCRIPTION</u>
1	PRELIMINARY EXAMINATION OF PRODUCT
2	PRE-PROOF VOLUME DETERMINATION
3	PROOF PRESSURE
4	POST PROOF VOLUME DETERMINATION
5	EXPULSION EFFICIENCY
6	WELD INSPECTION
7	INTERNAL HELIUM LEAK TEST (HIGH PRESSURE)
8	INTERNAL HELIUM LEAK TEST (LOW PRESSURE)
9	EXTERNAL LEAK TEST
10	CLEANLINESS VERIFICATION
*11	VIBRATION
12	POST VIBRATION INTERNAL HELIUM LEAK TEST (HIGH PRESSURE)
13	ACCELERATION
14	POST ACCELERATION INTERNAL HELIUM LEAK TEST (HIGH PRESSURE)
15	SPIN EXPULSION
16	CLEANLINESS VERIFICATION
17	INTERNAL VACUUM TEST
18	POST SPIN EXPULSION INTERNAL HELIUM LEAK TEST (LOW PRESSURE)
19	POST SPIN EXPULSION INTERNAL HELIUM LEAK TEST (HIGH PRESSURE)
20	TEMPERATURE CYCLE TEST
21	TEMPERATURE TEST COMBINED WITH LIFE CYCLING & EXPULSION EFFICIENCY
22	CLEANLINESS VERIFICATION
23	POST TEMPERATURE TEST INTERNAL HELIUM LEAK TEST (HIGH PRESSURE)

- 24 POST TEMPERATURE TEST  
INTERNAL HELIUM LEAK  
TEST (LOW PRESSURE)
- 25 EXTERNAL LEAK
- 26 FINAL EXAMINATION  
OF PRODUCT
- 27 BURST PRESSURE  
TEST
- 28 PREPARATION FOR  
DELIVERY

## **Vibration Test Set-Up**

FIGURE NO. 20  
"X" AXIS QUALIFICATION VIBRATION TEST SET-UP

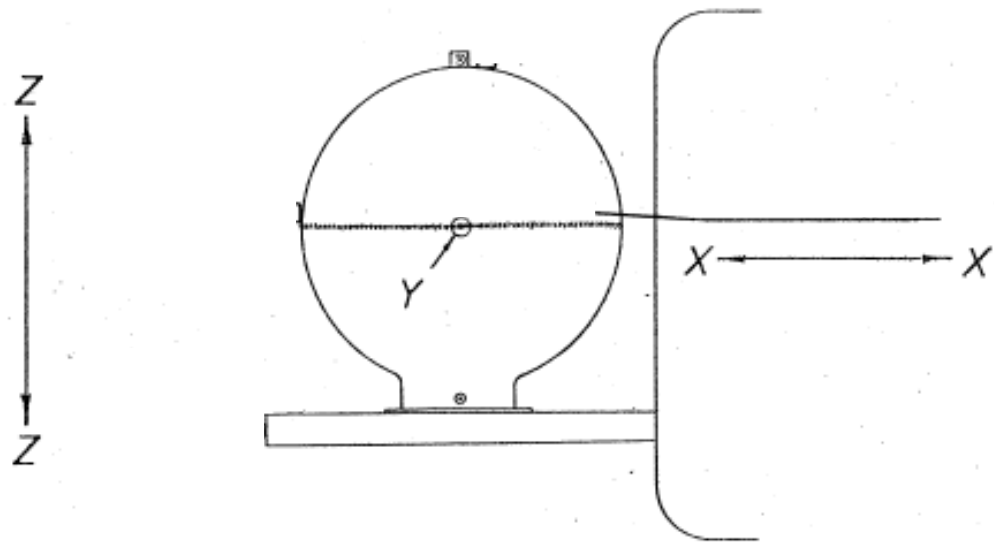


FIGURE NO. 18  
"Z" AXIS QUALIFICATION VIBRATION TEST SET-UP

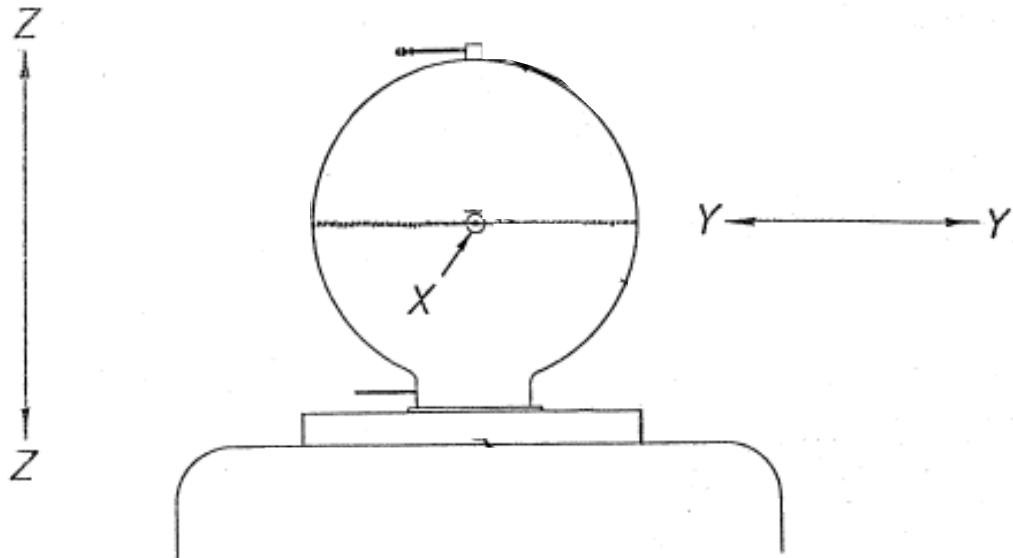


FIGURE NO. 6  
"Z" AXIS FIXTURE EVALUATION TEST SET-UP

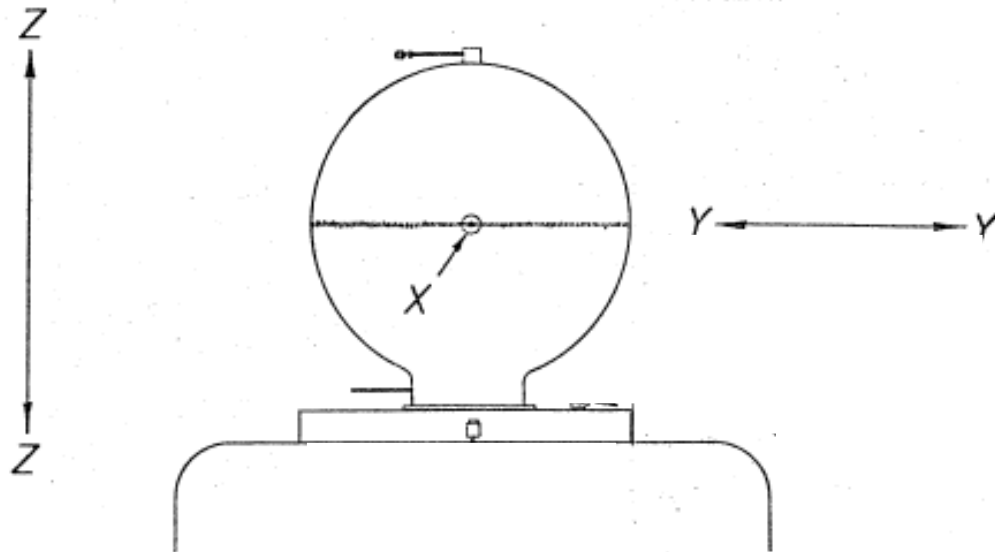
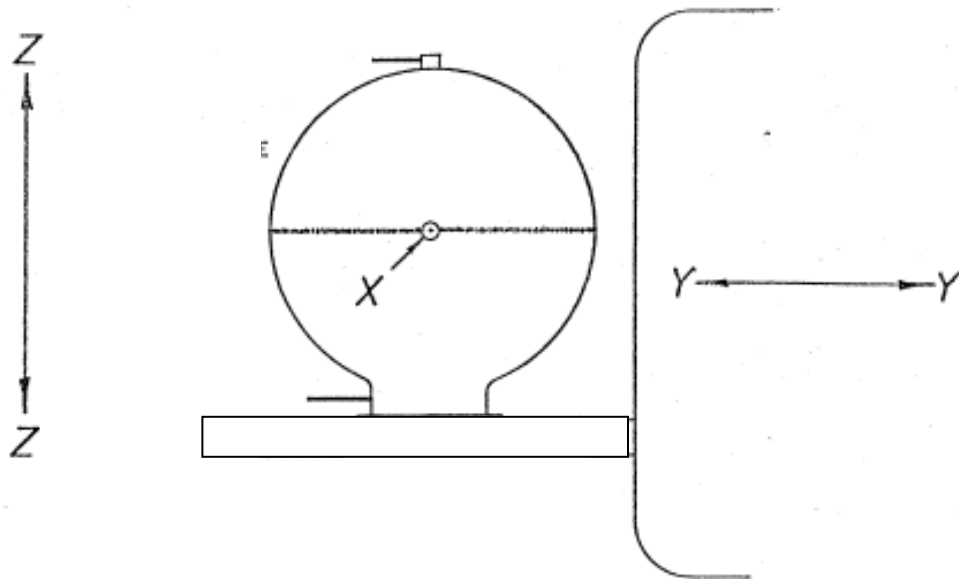




FIGURE NO. 10  
"Y" AXIS FIXTURE EVALUATION TEST SET-UP



## Sine Vibration (Wet)

### SINUSOIDAL

<u>Axis</u>	<u>FREQUENCY (Hz)</u>	<u>LEVEL</u>	<u>SWEEP RATE OCTAVES/MINUTE</u>
X, Y & Z	0 - 15	11 MM D. A.	2
X, Y & Z	15 - 35	10.0 g	2
X, Y & Z	35 - 60	20.0 g	2
X, Y & Z	60 - 70	10.0 g	2
X, Y & Z	70 - 100	7.0 g	2

Tank is loaded with 66, +0/-0.5 lbs of water and pressurized to 320, +10/-0 psig with nitrogen gas.

## Random Vibration (Wet)

<u>RANDOM</u>				
<u>Axis</u>	<u>FREQUENCY (Hz)</u>	<u>LEVEL (g<sup>2</sup>/Hz)</u>	<u>OVERALL LEVEL GRMS</u>	<u>TIME MINUTES/AXIS</u>
X, Y & Z	20 - 2000	0.20	20	1.5

Tank is loaded with 66, +0/-0.5 lbs of water and pressurized to 320, +10/-0 psig with nitrogen gas.

## **Acceleration**

Tank is loaded with 66, +0/-0.5 lbs of water and pressurized to 320, +10/-0 psig with nitrogen gas.

The tank is subjected to the following test levels for 1 minute duration in both directions.

+ Z - Z    20.0 G

+ X - X    17.5 G

+ Y - Y    17.5 G

### **Internal Vacuum Test**

Tank is evacuated to a pressure of 2 mm of Hg absolute or less for a 60, +1/-0 minute period.

### **Temperature Cycle Test**

The tank is refrigerated to  $-40^{\circ}\text{F}$ ,  $+0^{\circ}\text{F}/-5^{\circ}\text{F}$  and stabilized to 16,  $+1$  hours.

The tank is heated to  $150^{\circ}\text{F}$ ,  $+5^{\circ}\text{F}/-0^{\circ}\text{F}$  and stabilized to 8,  $+1$  hours.

## Temperature Test w/ Life Cycling

<u>TEST PHASE</u>	<u>TEST TEMPERATURE</u>	<u>REQUIRED EXPULSION CYCLES</u>	<u>TIME PERIOD TO COMPLETE CYCLES</u>
1ST	36 ± 3°F	*20	8 HOURS
2ND	134 ± 4°F	*20	8 HOURS
3RD	36 ± 3°F	10	4 HOURS
4TH	134 ± 4°F	10	4 HOURS
5TH	36 ± 3°F	10	4 HOURS
6TH	134 ± 4°F	10	4 HOURS
7TH	36 ± 3°F	10	4 HOURS
8TH	134 ± 4°F	10	4 HOURS
9TH	AMBIENT	1	EXPULSION EFFICIENCY

Tank is loaded with 66, +0/-0.5 lbs of water and pressurized to 320, +10/-0 psig with nitrogen gas.

## **Burst Pressure Test**

The tank is held for at least 15 seconds at the minimum requirement for the burst pressure 682 psig.

The tank was not ruptured.