

QUALIFICATION ENVIRONMENTS

FOR

NITROGEN GAS TANK

ATK P/N 80198-1

Table 1: P/N 80198-1 Nitrogen Gas Tank

Specifications

Parameters	Requirements
Operating Pressure	3625 psig
Proof Pressure	6208 psig, Actual Proof: 6208 psig
Burst Pressure	8267 psig, Actual Burst: 9400 psig
External Pressure	Not tested
Internal Vacuum	Not tested
Material of Construction	Tank is fabricated from hemispherical closed die forgings and machine welded at the girth.
Membrane Thickness	.172"
Tank Mount(s)	Mounting is provided by integral mating boss located normal to the plane of the girth weld.
Expulsion Efficiency	%
Design Fill Fraction	-
Tank Capacity	1147.25 in ³
Internal Dimensions	13.386" Ø spherical
Tank Weight	Maximum tank weight is 16.93 lbs, Actual tank weight is lbs
Propellant Capacity	
Shell Leakage	<1x10 ⁻⁷ std cc/sec He max, Actual: None @ 350 psig
Failure Mode	Burst
Natural Frequency	-
Temperature Environment	-
On Orbit Life	-

80198-1 was subjected to the following qualification tests:

TABLE 1

TEST SEQUENCE No.	DESCRIPTION OF TESTS
1	VISUAL INSPECTION
2	DIMENSIONAL INSPECTION
3	PROOF PRESSURE
4	LEAKAGE
5	RADIOGRAPHIC INSPECTION
6	CLEANLINESS DEMONSTRATION
7	SHOCK
8	ACCELERATION
9	VIBRATION
10	LEAKAGE
11	THERMAL VACUUM
12	LEAKAGE
13	PRESSURE CYCLING
14	LEAKAGE
15	FINAL PROOF PRESSURE
16	BURST PRESSURE

The following tests are listed in the report:

- 1) Proof Pressure Test
- 2) Shock Test
- 3) Acceleration Test
- 4) Vibration test
- 5) Thermal Vacuum Test
- 6) Pressure Cycling Test
- 7) Burst Pressure Test

Shock

Tank is pressurized to 3625 ± 15 psig.

Tank is subjected to three (3) shocks of magnitude 30 ± 3 g's in each direction along the Z-Z axis.

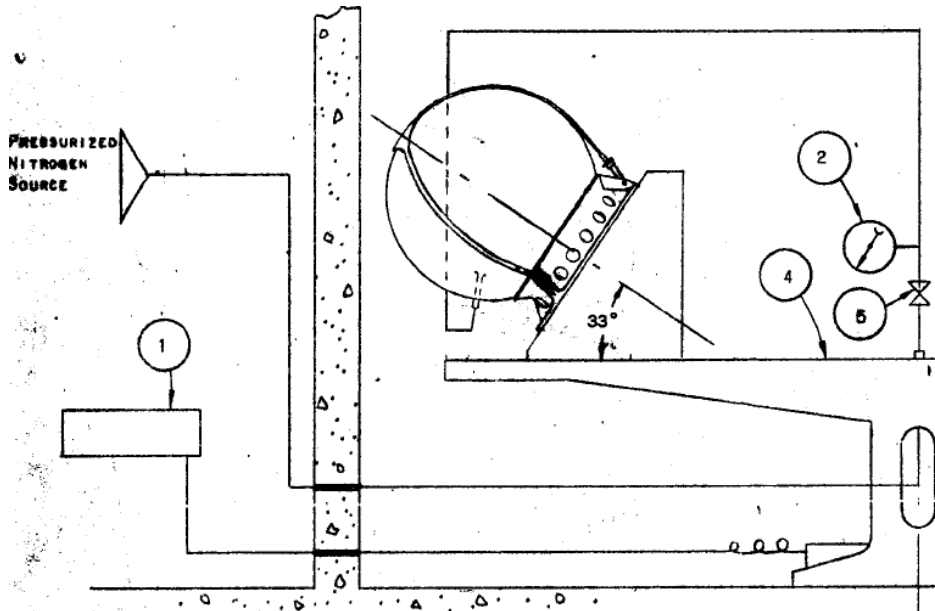
Tank is subjected to three (3) shocks of magnitude 15 ± 1.5 g's in each direction along the Y-Y axis.

Time to peak of each shock pulse shall be 6 ± 0.6 milliseconds, and duration of each shock pulse shall be 12 ± 1.8 milliseconds.

Acceleration

Tank is pressurized to 3625 ± 15 psig.

Tank is subjected to an acceleration force of 35 ± 0.7 g's for 15, +1/-0 minutes.



Sine Vibration (Dry)

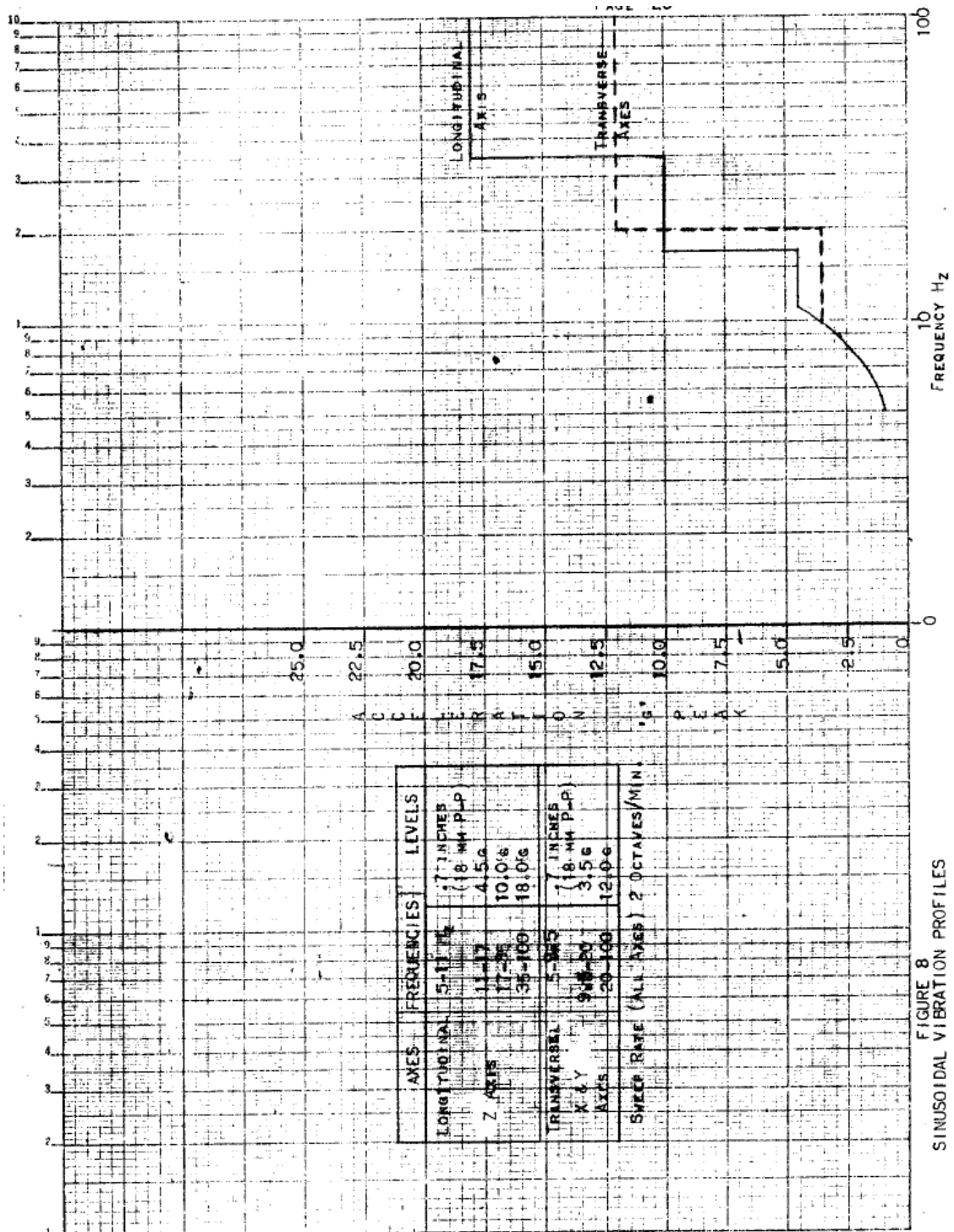
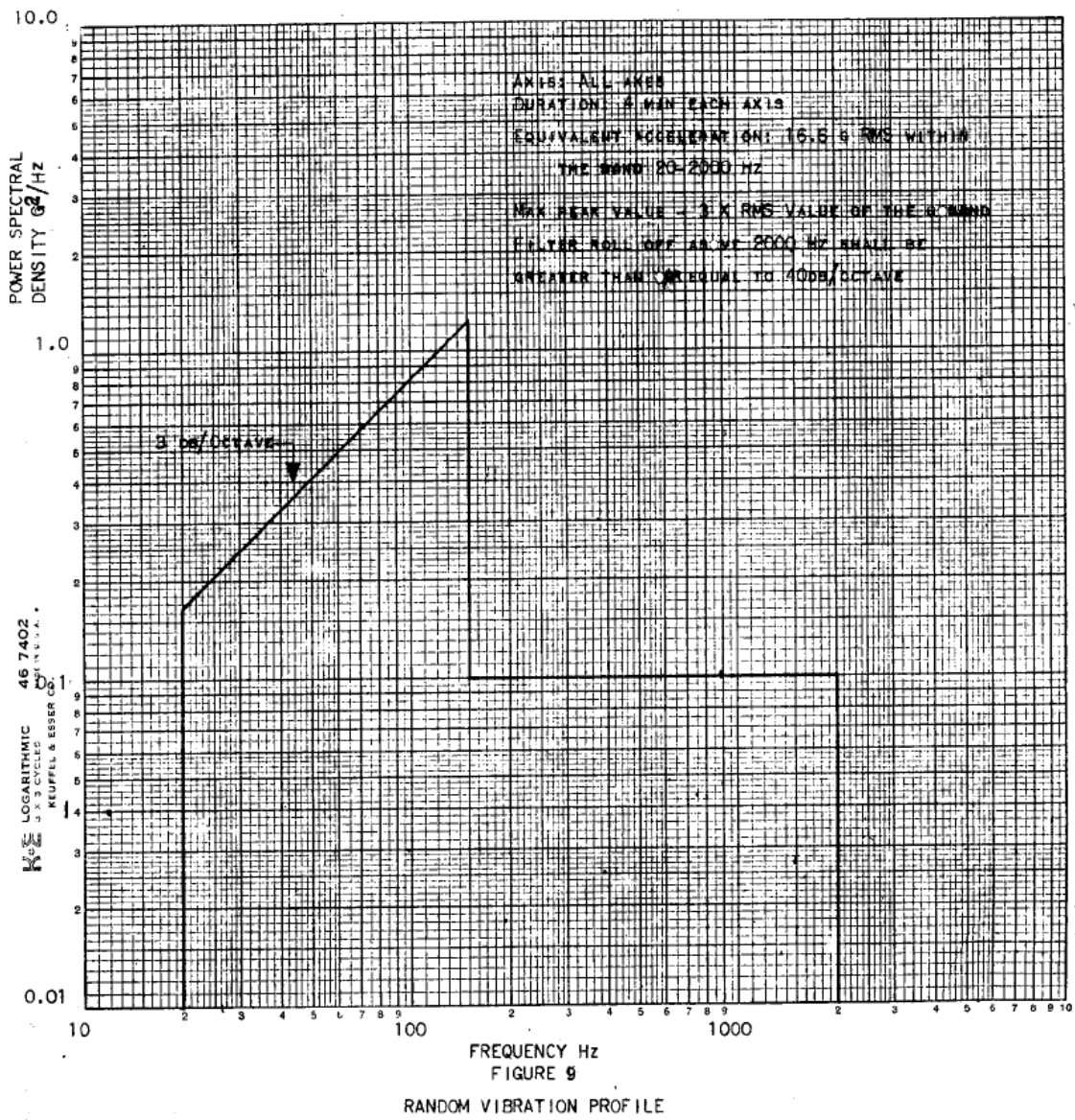


FIGURE 8
SINUSOIDAL VIBRATION PROFILES

Tank is pressurized to 3625 ± 15 psig.

Test is performed along the X, Y, and Z axis.

Random Vibration (Dry)



Tank is pressurized to 3625 ± 15 psig.

Test is performed along the X, Y, and Z axis.

Thermal Vacuum

Tank is pressurized to 3625 ± 15 psig, and put in a chamber where the pressure is 1×10^{-5} torr or less.

Temperature of the tank is increased to $122^{\circ}\text{F} \pm 5^{\circ}\text{F}$, and then decreased to $68^{\circ}\text{F} \pm 5^{\circ}\text{F}$. Number of cycles is 4.

Pressure Cycling

Tank is pressurized to 3625 ± 15 psig and held for 10 ± 5 seconds. Number of cycles is 100.

Burst

Tank is brought up to a pressure of 6200 psig. Tank is then pressurized further until rupture occurs. The rupture pressure shall be 8267 psig minimum.

The actual burst pressure was 9400 psig. The corrected burst pressure was 8829 psig.