

PROTOFLIGHT ENVIRONMENTS
FOR
MESSENGER PROPELLANT TANK ASSEMBLY
ATK P/N 80433-1

80433-1 was subjected to the following protoflight tests:

TEST SEQUENCE	TEST DESCRIPTION
1	Examination of Product, Preliminary
2	Volumetric Capacity Measurement
3	Proof Pressure Test
4	Volumetric Capacity Measurement
5	External Leak Test
6	Protoflight Vibration & Modal Survey
7	External Leak Test
8	Weld Quality Inspection
9	Examination of Product, Final
10	Precision Clean

Sine Vibration (Wet)

Protoflight Sine Vibration

Axes	Frequency (Hz)	Acceleration	Sweep Rate
Thrust	10 – 24 24 – 28 28 – 100	0.5 inch DA 14.3 g's 2.48 g's	4 oct/min
Lateral (2 axes)	10 – 20 20 – 25 25 – 100	0.34 in. DA 6.90 g 1.96 g	4 oct/min
Notes: (1) Limit acceleration at C.G. (geometric center of the tank) to the following: thrust axis 14.3 g, lateral axes 6.9 g. (2) Thrust testing with propellant end up. (3) Test fixture modes under 200 Hz shall be identified so that the controller input can be notched to achieve the specified environment. (4) Low level (.1g to .25g) sine sweep survey from 10 to 150 Hz shall be performed prior to and after each vibration axis. Any resonant frequency shift greater than 5% or resonant magnitude change greater than 10% from pre to post low level surveys shall require review and approval by Aerojet.			

Tank is loaded with 422, +2/-0 lbm of D.I. water and pressurized to 150, +15/-0 psig.

Modal Survey

Frequency (Hz)	Acceleration	Sweep Rate
5 to 150 Hz	0.1 g to .25 g	4 Octaves/minute

Tank is loaded with 422, +2/-0 lbm of D.I. water and pressurized to 150, +15/-0 psig.

Test conducted for each axis.