

PROTOFLIGHT ENVIRONMENTS
FOR
SERIES 7000 PRESSURANT TANK
ATK P/N 80373-1

80373-1 was subjected to the following protoflight tests:

Test Sequence	Test Title
1	Examination of Product
2	Tank Assy Bubblepoint Test
3	Pre-Proof Vol Capacity Test
4	Proof Pressure Test
5	Post-Proof Vol Capacity Test
6	Cryogenic Proof Pressure & Post-Cryo Dimensional
7	Vibration Test-Protoflight Levels Dry Random Wet Sine Wet Random
8	External Leakage
9	Tank Assy Bubblepoint Test
10	Radiographic & Dye Penetrant Inspection
11	Final Examination of Product
12	Cleanliness
13	Preparation for Delivery

Random Vibration (Dry)

AXIS	FREQUENCY (HZ)	PROTOFLIGHT
ALL	20-200	+2.1dB/oct
	200-1000	0.06 g ² /Hz
	1000-2000	-3.0dB/oct

- Test duration is 1 minute per axis.
- Limit the tank response to 0.40 g²/Hz below 500 Hz and 2.0 g²/Hz from 500-2000 Hz.in each of the three axis. These limits are applied only at the tank major resonant frequencies. Local shell response spikes (narrow frequency bands less than 20 Hz or the associated energy less than 10 g RMS) shall not require additional limiting.

Tank is pressurized to 80, ± 5 psi with gaseous nitrogen.

Sine Vibration (Wet)

TEST AXIS	FREQUENCY (HZ)	INPUT LEVEL (0-Peak)	RESPONSE LIMIT
"X"(Thrust)	5-17	0.5 (D.A.)	10.0 g's
	17-30	9.0 g	
	30-65	3.6 g	
	65-100	1.5 g	
"Y" & "Z" (LATERAL)	5-11	0.5 (D.A.)	5.8 g's
	11-65	3.6 g	
	65-100	1.2 g	

- 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.

Tank is filled with 730, +0/-5 lbs of D.I. water and pressurized to 80, \pm 5 psi.

Sinusoidal vibration test conducted at 4 oct/min.

Random Vibration (Wet)

AXIS	FREQUENCY (HZ)	PROTOFLIGHT
ALL	20-200	+2.1dB/oct
	200-1000	0.06 g ² /Hz
	1000-2000	-3.0 dB/oct

- Test duration is 1 minute per axis.
- Limit the tank response to 0.40 g²/Hz below 500 Hz and 2.0 g²/Hz from 500-2000 Hz in each of the three axis. These limits are applied only at the tank major resonant frequencies. Local shell response spikes (narrow frequency bands less than 20 Hz or the associated energy less than 10 g RMS) shall not require additional limiting.
- The random vibration test input PSD allowable tolerance shall be ± 3 dB on the original test input requirement. At the resonant frequency, notching of the test input may be necessary to limit the tank response, however, the input PSD allowable tolerance should not be below -3dB of the notched input level.

Tank is filled with 730, +0/-5 lbs of D.I. water and pressurized to 80, \pm 5 psi.