QUALIFICATION ENVIRONMENTS

FOR

TANK, POSITIVE EXPULSION

ATK P/N 80278-1

Table 1: P/N 80278-1 Positive Expulsion Tank Assembly Specifications

Parameters	Requirements
Operating Pressure	psig
Proof Pressure	psig, Actual Proof: psig
Burst Pressure	psig, Actual Burst: psig,
External Pressure	
Internal Vacuum	
Material of Construction	Spherical vessel
Membrane Thickness	″
Tank Mount(s)	Mounted by two (2) polar mounting bosses.
Expulsion Efficiency	99.74%
Design Fill Fraction	-
Tank Capacity	in^3
Internal Dimensions	9.5″ Ø
Tank Weight	Maximum tank weight is lbs, Actual tank weight is 15.08 lbs
Propellant Capacity	-
Shell Leakage	$<1x10^{-6}$ std cc/sec He max, Actual:
Failure Mode	Burst
Natural Frequency	-
Temperature Environment	-
On Orbit Life	-

80278-1 was subjected to the following qualification tests:

Test Sequence	Test Description
1	Life Cycle, Expulsion Efficiency and Pressure Drop
2	Post Life Cycle Test
	A) Expulsion Efficiency
	B) Pressure Drop Test
	C) Internal Leak Test
	D) External Leak Test

The following tests are listed in this document:

1) Life Cycle Test

No Burst or Pressure Test are available.

Life Cycle Test

Tank is loaded with 6.25, +0.25/-0 lbs of water and pressurized to 93, +5/-0 psig. Number of cycles is 200.

PSI 2017 camfield avenue los angeles, cal. 90040
PRESSURE SYSTEMS, INC.

PSI Report No. 56-000092
Appendix B, Page B-2

N/C						

DATA SHEET A-1
LIFE CYCLE, EXPULSION EFFICIENCY

Date: 5-26-82
PSI Part No. 80278-1
PSI Serial No. 0003
PSI Part Name: Tank, Positive Expulsion

Test Equipment: PRESSURE GAUGE (L-014)
0-400 PSIG CALIB. DUE 9-25-82
SARTAR SCALE (E-0486) 0-8000 GRAMS CALIB. DUE 9-10-82

Test Media: Deionized Water and Nitrogen

LIFE CYCLE TESTS		Actual	Required
Life Cycle	(See Note 1)*	Water Resistivity 17 MEGOHMS	500,000 OHMS
Water Loaded	(See Note 1)	Water pH 7.2	5.5 - 8.0
Test Pressure	(See Note 1)		

NOTE: 1 * Record on Pages 2 thru 3 of Data Sheet "A"
:Expulsion Efficiency shall be measured on the 66th and 133rd
:Pressure Drop shall be measured during the 67th and 134th cycles.

ITEM	EXPULSION EFFICIENCY TEST	66th CYCLE	133rd CYCLE	REQUIREMENT
1	(W_d) Weight-Dry Specimen, Fixture, etc.	15.08	15.08	
2	(W_l) Weight-Loaded Specimen, Fixture etc.	25.48	25.48	
3	Weight - Net Water Load	10.4	10.4	$10.3^{+.2}_{-.0}$ lbs
4	Expulsion Pressure	19.5 PSIG	19.5 PSIG	20^{+0}_{-1} PSIG
5	(W_w) Weight-Wet Specimen, Fixture, etc. (After complete expulsion)	15.106	15.107	
6	Expulsion Efficiency	99.75	99.74	99.0% Min.

FORMULA:

$$\frac{W_l - W_w}{W_l - W_d} (100) = \text{Expulsion Efficiency}$$

Tested By: [signature] Date 5-26-82 Specimen Passed YES

PSI 2017 camfield avenue los angeles, cal. 90040
PRESSURE SYSTEMS, INC.

DATA SHEET "A-2"

CYCLE	H_2O LOAD	TEST PRESS.	CYCLE	H_2O LOAD	TEST PRESS.	CYCLE	H_2O LOAD	TEST PRESS.	CYCLE	H_2O LOAD	TEST PRESS.
1	6.3	96.0 PSIG	26	6.3	96.0 PSIG	51	6.3	96.0 PSIG	76	6.3	96.0 PSIG
2	6.4	95.0 PSIG	27	6.3	96.0 PSIG	52	6.3	96.0 PSIG	77	6.3	96.0 PSIG
3	6.4	96.0 PSIG	28	6.3	95.0 PSIG	53	6.3	97.0 PSIG	78	6.3	96.0 PSIG
4	6.4	98.0 PSIG	29	6.3	98.0 PSIG	54	6.3	96.0 PSIG	79	6.3	96.0 PSIG
5	6.4	98.0 PSIG	30	6.3	96.0 PSIG	55	6.3	96.0 PSIG	80	6.3	96.0 PSIG
6	6.3	96.0 PSIG	31	6.4	96.0 PSIG	56	6.3	96.0 PSIG	81	6.3	96.0 PSIG
7	6.4	96.0 PSIG	32	6.3	96.0 PSIG	57	6.4	96.0 PSIG	82	6.3	96.0
8	6.3	96.0 PSIG	33	6.3	96.0 PSIG	58	6.4	96.0 PSIG	83	6.4	96.0
9	6.3	97.0 PSIG	34	6.4	96.0 PSIG	59	6.4	96.0 PSIG	84	6.3	96.0
10	6.4	96.0 PSIG	35	6.3	96.0 PSIG	60	6.4	96.0 PSIG	85	6.3	96.0
11	6.3	97.0 PSIG	36	6.3	96.0 PSIG	61	6.4	96.0 PSIG	86	6.3	96.0
12	6.3	97.0 PSIG	37	6.3	96.0 PSIG	62	6.4	96.0 PSIG	87	6.3	96.0
13	6.3	96.0 PSIG	38	6.3	96.0 PSIG	63	6.4	96.0 PSIG	88	6.3	96.0
14	6.4	97.0 PSIG	39	6.3	96.0 PSIG	64	6.4	96.0 PSIG	89	6.3	96.0
15	6.3	96.0 PSIG	40	6.3	96.0 PSIG	65	6.4	96.0 PSIG	90	6.3	96.0
16	6.3	96.0 PSIG	41	6.4	97.0 PSIG	66	6.4	96.0 PSIG	91	6.3	96.0
17	6.4	97.0 PSIG	42	6.4	97.0 PSIG	67	6.4	97.0 PSIG	92	6.3	96.0
18	6.3	97.0 PSIG	43	6.3	97.0 PSIG	68	6.3	96.0 PSIG	93	6.4	96.0
19	6.3	94.0 PSIG	44	6.3	96.0 PSIG	69	6.3	96.0 PSIG	94	6.3	96.0
20	6.3	95.0 PSIG	45	6.4	96.0 PSIG	70	6.3	96.0 PSIG	95	6.3	96.0
21	6.3	97.0 PSIG	46	6.4	96.0 PSIG	71	6.3	96.0 PSIG	96	6.3	97.0
22	6.3	96.0 PSIG	47	6.3	96.0 PSIG	72	6.3	96.0 PSIG	97	6.3	96.0
23	6.3	96.0 PSIG	48	6.3	97.0 PSIG	73	6.3	96.0 PSIG	98	6.4	96.0
24	6.3	96.0 PSIG	49	6.3	96.0 PSIG	74	6.3	96.0 PSIG	99	6.3	96.0
25	6.3	98.0 PSIG	50	6.3	96.0 PSIG	75	6.3	96.0 PSIG	100	6.3	96.0

PSI 2017 camfield avenue los angeles, cal. 90040
PRESSURE SYSTEMS, INC.

DATA SHEET "A-3"

PSI Report No. 56-000092
Appendix B, Page B-4

CYCLE	H_2O LOAD	TEST PRESS.	CYCLE	H_2O LOAD	TEST PRESS.	CYCLE	H_2O LOAD	TEST PRESS.	CYCLE	H_2O LOAD	TEST PRESS.
101	6.3	96.0	126	6.3	96.0	151	6.3	96.0	176	6.3	96.0
102	6.3	96.0	127	6.3	96.0	152	6.3	96.0	177	6.4	96.0
103	6.3	96.0	128	6.3	96.0	153	6.3	96.0	178	6.3	96.0
104	6.3	96.0	129	6.4	96.0	154	6.3	96.0	179	6.3	97.0
105	6.3	96.0	130	6.3	96.0	155	6.3	96.0	180	6.3	97.0
106	6.3	96.0	131	6.3	96.0	156	6.3	96.0	181	6.4	97.0
107	6.3	96.0	132	6.3	96.0	157	6.3	96.0	182	6.3	96.0
108	6.3	96.0	133	6.3	96.0	118	6.3	96.0	183	6.3	96.0
109	6.3	96.0	134	6.4	97.0	159	6.4	96.0	184	6.3	96.0
110	6.3	96.0	135	6.3	96.0	160	6.3	96.0	185	6.3	96.0
111	6.3	96.0	136	6.3	96.0	161	6.3	96.0	186	6.3	96.0
112	6.3	96.0	137	6.3	96.0	162	6.4	96.0	187	6.3	96.0
113	6.3	96.0	138	6.3	96.0	163	6.3	96.0	188	6.3	96.0
114	6.3	96.0	139	6.3	96.0	164	6.3	96.0	189	6.3	96.0
115	6.4	98.0	140	6.3	96.0	165	6.3	96.0	190	6.3	96.0
116	6.3	96.0	141	6.3	96.0	166	6.3	96.0	191	6.3	96.0
117	6.3	96.0	142	6.3	96.0	167	6.4	96.0	192	6.3	96.0
118	6.3	97.0	143	6.4	94.0	168	6.4	96.0	193	6.3	96.0
119	6.3	96.0	144	6.3	97.0	169	6.3	96.0	194	6.3	96.0
120	6.3	96.0	145	6.3	96.0	170	6.3	96.0	195	6.4	96.0
121	6.3	96.0	146	6.3	96.0	171	6.3	96.0	196	6.3	96.0
122	6.3	96.0	147	6.3	96.0	172	6.3	96.0	197	6.3	96.0
123	6.3	96.0	148	6.3	96.0	173	6.3	96.0	198	6.3	96.0
124	6.3	96.0	149	6.3	96.0	174	6.3	96.0	199	6.3	96.0
125	6.3	96.0	150	6.3	96.0	175	6.4	96.0	200	6.3	96.0