

ESTES A3T

CERTIFIED VALUES

Total Impulse: 2.50 newton-seconds
Delays: 2, 4, 6 seconds

Propellant Type: Black Powder
Propellant Mass: 3.3 grams

Casing Dimensions: 13 mm x 45 mm

Certification Date: Continuing
Contest Use Date: Continuing

Certification Type: Model Rocket

STATIC TEST DATA

Date Tested: 1995-June-24, 2022-February-12

Total Impulse: 2.22 newton-seconds (σ 0.09)

Peak Thrust: 5.83 newtons (σ 0.73)

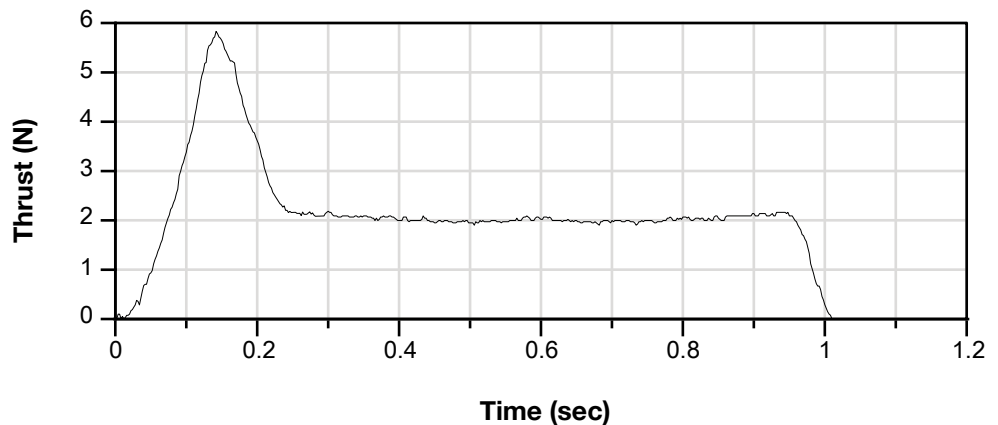
Burn Time: 1.01 seconds (σ 0.04)

Average Thrust: 2.20 newtons (σ 0.19)

Mass After Firing: 3.8 grams (σ 1.45)

Delay Time	Average Measured Delay	Initial Mass	Fired Mass
2	1.53	8 g	4 g
4	3.12	8.5 g	3.4 g
6	5.36	9 g	4 g

TYPICAL THRUST-TIME CURVE



REMARKS

2022-02-12: Tested 2 and 6 second delays



Test Data from 2022-02-12

Test ID	Delay	I-Total	f-Max	f-Avg	t-Burn	t-Delay	m-Init	m-Post
E220102	2	2.13	9.04	2.75	0.77	1.51	7.00	4.00
E220103	2	2.27	8.46	2.98	0.76	1.20	8.00	4.00
E220104	2	2.25	7.86	2.76	0.82	1.76	8.00	2.00
E220105	2	2.13	7.96	2.70	0.79	1.63	8.00	5.00
E220106	6	2.13	7.26	2.49	0.86	5.25	9.00	4.00
E220107	6	2.41	8.45	2.95	0.82	5.59	9.00	2.00
E220108	6	2.23	7.98	2.82	0.79	5.12	8.00	
E220109	6	2.21	7.46	2.64	0.84	5.43	9.00	2.00
E220110	6	2.13	6.39	2.35	0.90	5.39	9.00	4.00
Average		2.21	7.87	2.72	0.82		8.30	3.10
σ		0.09	0.73	0.19	0.04		0.64	1.45
$\% \sigma$		4.04	9.29	7.06	5.15		7.71	46.63
	<u>Delay</u>	<u>Average</u>	<u>σ</u>	<u>$\% \sigma$</u>				
	2	1.53	0.21	13.55				
	6	5.36	0.16	2.98				

; Estes A3T RASP.ENG file made from NAR published data
; File produced October 3, 2000
; The total impulse, peak thrust, average thrust and burn time are
; the same as the averaged static test data on the NAR web site in
; the certification file. The curve drawn with these data points is as
; close to the certification curve as can be with such a limited
; number of points (32) allowed with wRASP up to v1.6.

A3T 13 45 4 .0033 .0085 E
0.024 0.195
0.048 0.899
0.086 2.658
0.110 4.183
0.140 5.830
0.159 5.395
0.180 4.301
0.199 3.635
0.215 2.736
0.234 2.267
0.258 2.150
0.315 2.072
0.441 1.993
0.554 2.033
0.605 2.072
0.673 1.954
0.764 1.954
0.874 2.072
0.931 2.150
0.953 2.072
0.966 1.719
0.977 1.173
0.993 0.547
1.010 0.000

