

ESTES E12

CERTIFIED VALUES

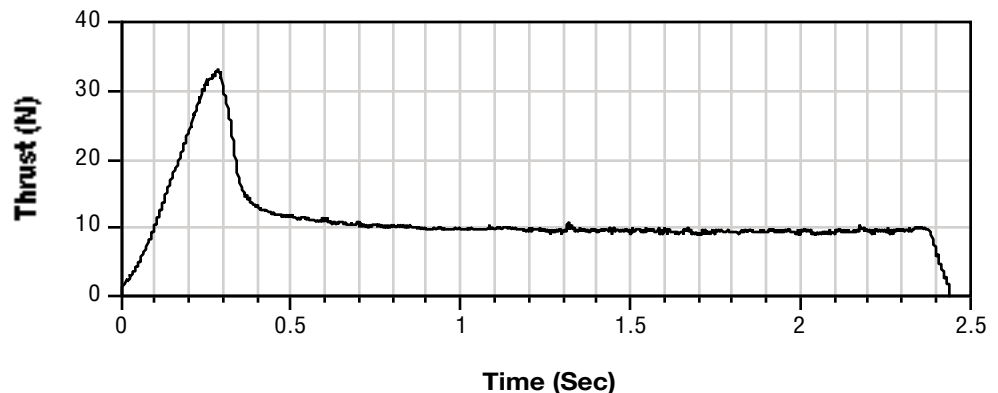
Total Impulse: 27.24 newton-seconds
Delays: 0, 4, 6, 8 seconds
Propellant Type: Black Powder
Propellant Mass: 35.9 grams
Casing Dimensions: 24 mm × 95 mm
Certification Type: Model Rocket

STATIC TEST DATA

Date Tested: 2011-June-17
Total Impulse: 27.24 newton-seconds (σ 0.35)
Peak Thrust: 33.29 newtons (σ 3.49)
Burn Time: 2.44 seconds (σ 0.04)
Average Thrust: 11.17 newtons
Mass After Firing: 20.8 grams

Delay Time	Average Measured Delay	Initial Mass	Mfg Recommended Max Liftoff Weight
0	0.00	52.6 g	
4	3.98	58.5 g	
6	5.68	59.9 g	
8	8.63	57.9 g	

TYPICAL THRUST-TIME CURVE



REMARKS

FILE NAME	MOTOR	IT	F-MAX	F-AVG	T-BURN	T-DELAY
E110901	E12-0	26.437	45.558	11.136	2.374	0.000
E110902	E12-0	27.324	33.480	11.300	2.418	0.000
E110903	E12-0	26.709	34.309	11.147	2.396	0.000
E110904	E12-4	27.482	34.365	11.217	2.450	4.290
E110905	E12-4	27.339	31.941	10.936	2.500	3.668
E110906	E12-4	27.760	33.846	11.230	2.472	3.984
E110907	E12-6	27.080	33.143	11.283	2.400	5.568
E110908	E12-6	27.077	31.922	10.892	2.486	5.542
E110909	E12-6	27.411	32.573	11.262	2.434	5.936
E110910	E12-8	27.263	34.465	11.164	2.442	8.438
E110911	E12-8	27.460	33.385	11.282	2.434	8.956
E110912	E12-8	27.490	32.805	11.221	2.450	8.482
	AVG	27.24	33.29	11.17	2.44	
	STD	0.35	3.49	0.13	0.04	
	STD %	1.28	10.49	1.13	1.47	

Note: max thrust of file E110901
is not counted in the avg.

DELAYS

ALLOWABLE RANGE	INDICATEI	AVG	ACTUAL	ACTUAL	ACTUAL
-1.5 TO 1.5	0	0.00	0.000	0.000	0.000
2.5 TO 5.5	4	3.98	4.290	3.668	3.984
4.5 TO 7.5	6	5.68	5.568	5.542	5.936
6.4 TO 9.6	8	8.63	8.438	8.956	8.482

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; Estes E12 RASP.ENG file made from NAR published data
; File produced October 3, 2011
; 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.

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E12 24 95 0-2-6-7 .0359 .0585 E
0.002 1.678
0.050 4.459
0.100 10.431
0.200 24.152
0.274 31.959
0.292 32.702
0.310 27.957
0.320 25.957
0.330 22.857
0.340 19.128
0.350 16.455
0.360 15.314
0.380 13.853
0.390 13.436
0.400 13.271
0.450 12.070
0.500 11.522
0.550 11.266
0.600 10.736
0.650 10.777
0.700 10.276
0.800 10.105
0.900 9.920
1.000 9.693
1.310 9.759
1.316 10.696
1.330 9.628
2.380 9.870
2.400 6.442
2.420 3.674
2.440 0.000

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