

NAR OFFICIAL CERTIFICATION LABORATORY

MODEL ROCKET ENGINE TESTING REPORT

Manufacturer and Type: Alpha I250

Effective Dates: NAR Certification: 5/29/09

Certified Total Impulse (N-sec): 540.0 Delay Times: Plugged

Propellant Type: candlepower/nitrous oxide Propellant Mass (gm): 353.8 (includes fuel grain and nitrous oxide)

Casing Diameter (mm): 54 Casing Length (mm): 711

----- STATIC TEST DATA -----

Date Tested: 05/23/09 Test Temp (°C): 24 Elevation (ft): 0

Number Tested: 3 Date Codes:

Total Impulse (N-sec): 540.0 Std. deviation: 30.41

Peak Thrust (Newtons): 375.0 Std. deviation: 5.41

Burn Time (seconds): 2.32 Std. deviation: .04

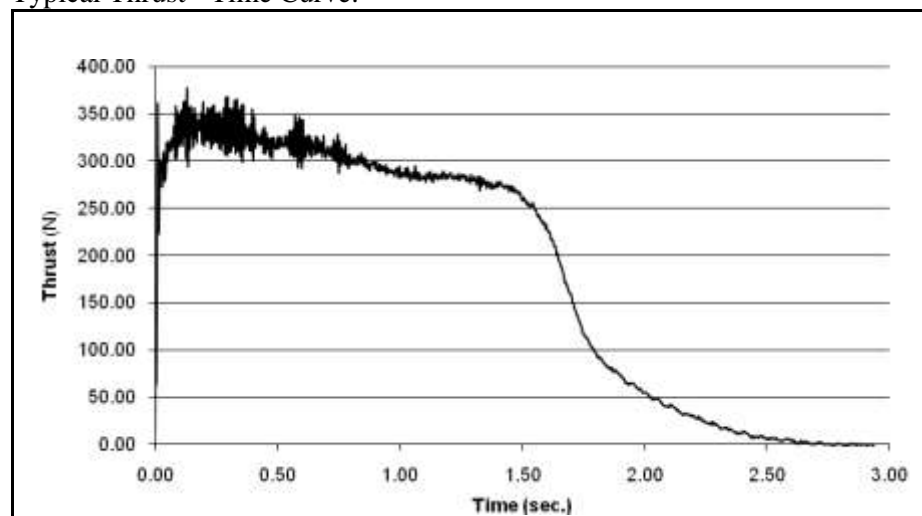
Average Thrust (Newtons): 231.0

Casing Burnt Mass (gm): 1568.9

Max Casing External Temp (°C): 84; Acceptable

|                        |         |  |  |
|------------------------|---------|--|--|
| Delay Time (sec)       | P       |  |  |
| Initial Mass (gm.)     | 1853.7  |  |  |
| Average Measured Delay | Plugged |  |  |

Typical Thrust - Time Curve:



| Data File |        | Total   | Max    | Avg       | Burn  | Delay   | Init   | Fired  |
|-----------|--------|---------|--------|-----------|-------|---------|--------|--------|
| #         | Engine | Impulse | Thrust | Thrust    | Time  | Time    | Weight | Weight |
| Alpha001  | I250   | 518.6   | 368.3  | 220.1     | 2.34  | plugged | 1850.2 | 1572.8 |
| Alpha002  | I250   | 526.5   | 378.1  | 229.7     | 2.28  | plugged | 1852.2 | 1570.5 |
| Alpha003  | I250   | 574.8   | 378.1  | 243.3     | 2.35  | plugged | 1858.8 | 1563.3 |
|           |        |         |        |           |       |         |        |        |
|           |        |         |        |           |       |         |        |        |
| Average   |        | 540.0   | 375.0  | 231.0     | 2.32  |         | 1853.7 | 1568.9 |
|           |        |         |        |           |       |         |        |        |
|           |        |         |        |           |       |         |        |        |
| Std Dev   |        | 30.41   | 5.41   | 11.68     | .04   |         |        |        |
| Std Dev % |        | 5.63%   | 1.44%  | 5.06<br>% | 1.65% |         |        |        |