

TR-312-100MN High Performance Dual Mode Liquid Apogee Engine

This advanced liquid apogee engine incorporates Northrop Grumman's high performance pintle injector for reliable, high-performance, multiple-start capabilities for long-life spacecraft operations. Based on flight proven-designs, the thrust chamber is fabricated of powder metallurgy rhenium, which offers high strength and isotropic properties. The chamber is also coated with iridium (internally/externally), rhodium (internally), and hafnium oxide (externally). Special joining techniques are used for the injector-chamber and nozzle-nozzle extension all-metal joints.

Heritage

Two flight-like engines in pre-qualification testing.

Availability

20 months after receipt of order.

Characteristics

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|-----------------------------|---------------------------------------|
| Propellants | N ₂ O ₄ and MMH |
| Thrust | 113 lbf |
| Mixture Ratio | 1.65 |
| Specific Impulse | 325 seconds |
| Nozzle Expansion Area Ratio | 245 |
| Inlet Press | 230 psia |
| Engine length | 28.0 inches |
| Nozzle Exit Diameter | 11.8 inches |
| Engine Weight | 13.3 lbm |
| Demonstration Life | 25,000 seconds |
| Maximum Firing Duration | 3,000 seconds |
| Throughput | ~4 tons |
| Vibration (Qual) | 7.36 g-rms |

