

LEROS 2c Apogee Engine

- Bipropellant Liquid Thruster



The **Nammo Space** designed and manufactured **321 second Isp**, MON/MMH apogee engine delivers a thrust of **430 N**.

The engine has been developed using the advances made Nammo engineers in engine injector/chamber assembly design gained from the ESA High Thrust LEROS 4 Engine program, while maintaining the heritage of our long running production programs.

This engine, which utilizes relatively inexpensive

Niobium alloys with a Titanium expansion cone. The price of this engine approximately 30% lower than current market offerings for this class of high performance apogee engines.

The Nammo Ireland AEV flow control valves, is being offered to the telecommunications and science mission primes.

All Nammo apogee engines are hot-fire tested in the UK **National Space Propulsion Test Facility** at Nammo Westcott.



LEROS 2c engine in test

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|----------------------------------|--|
| Typical Application | Apogee or Main delta V engine |
| Typical Operational Mode | Long duration burn(s) e.g. 3 x 9,000sec |
| Propellant | MON/MMH |
| Thrust range | 410 N to 450 N [92 lbf 101 lbf] |
| Thrust at nominal inlet pressure | 430 N [97 lbf] |
| Mixture Ratio Range | 1.5 to 1.8 [oxidiser to fuel] |
| Mixture Ratio | 1.65 nominal inlet pressure |
| Specific Impulse | 321 seconds minimum |
| Total Impulse | 12,900,000 Nsec |
| Throughput | >4,000 kg |
| Inlet Pressure | 15.4 bara nominal |
| Inlet Pressure Range | 13.5 bara to 17 bara |
| Restarts Demonstrated | 75 off with Chamber temp. <100°C [start], >1300°C [finish] |
| Maximum Duration Single Firing | 9,000 seconds demonstrated in Qualification |
| Cumulative Duration | >30,000 seconds demonstrated in Qualification |
| Engine Mass | < 4.2 kg |
| Operating Temperature | 1350°C maximum |
| Propellant Temperature | +4°C to +40°C |
| Storage Temperature | -53°C to +65°C |
| Storage Life | 4 years |
| Operational Life | 19 years |
| Reliability | 0.995 |
| Valve Type | 2 off Solenoid, Single Seat, Redundant Coil |
| Qualified Valve Cycles | 10,500 on/off cycles |
| Technology Readiness Level | TRL9 |



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