

LEROS 1b Apogee Engine

- Bipropellant Liquid Thruster



The **Nammo Space** designed and manufactured **317 second** Isp, MON/ Hydrazine dual mode apogee engine delivers a thrust of **635 N**.

18 off the **LEROS 1b** engines have flown successfully on deep space missions and telecoms platforms.

The JPL Juno mission to Jupiter used a LEROS 1b engine, which was highly praised for its faultless and predictable performance on this demanding 5.5 year mission.

The LEROS 1b engine has also successfully completed interplanetary missions to Mercury and Mars.

This renowned LEROS apogee engine is the default selection for deep space and Earth orbital

missions where high thrust and reliability are crucial to the mission success.

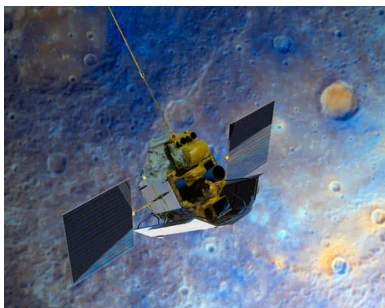
The base material for the thrust chamber and expansion cone is C103 Niobium alloy, coated with R512E Disilicide for oxidation protection.

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

Delivery timescales are typically 12-18 months.



Jupiter Juno Spacecraft



Mercury Messenger



Mars Global Surveyor

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Typical Application	Apogee or Main delta V engine
Typical Operational Mode	Long duration burn eg 3x5,000s, with pulsing capability
Propellant	MON/Hydrazine
Thrust Range	587 N to 707 N [132 lbf to 159 lbf]
Thrust, nominal inlet pressure	635 N [143 lbf]
Mixture Ratio Range	0.8 to 0.9 [oxidiser to fuel]
Mixture Ratio	0.85 [nominal inlet pressures]
Specific Impulse	317 s [minimum]
Total Impulse	12,965,000 Ns
Propellant Throughput	4,170 kg
Inlet Pressure Range	15 bara to 21 bara
Restarts Demonstrated	70 off [Chamber temp. <100°C[start], >1300°C[finish]
Maximum Duration Single Firing	2,520 s demonstrated in Qualification
Cumulative Duration	20,500 s demonstrated in Qualification
Engine Mass	4.5 kg
Operating Temperature	1380°C maximum
Propellant Temperature	+10°C to +35°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
Valve Voltage	24 Vdc to 35.5 Vdc, per coil
Technology Readiness Level	TRL9



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