

High-Energy Flash-lamp pumped Q-switched Nd:YAG Laser System and its Accessories for Atmospheric Lidar Application

System Description / Indented Items*

No.	Description of the Items	Quantity
1	High-energy Flash-lamp pumped Q-switched Nd:YAG Laser System with frequency doubling, emitting @ 532 nm wavelength, including Power Supply and other essential accessories, for atmospheric lidar application	One set
Laser Accessories:		
2	Essential spares (items not covered under warranty) and consumables such as Flashlamps for Oscillator and Amplifiers, Cartridges/Filters etc., for the operation of the offered Laser System for 5000 hours. <i>[List of items and their quantity should be provided].</i>	One set
3	Laser Chiller (adequate for the thermal management of the offered Laser System) with essential accessories and spares	One set
4	Laser Power and Energy Meter with sensor, display unit and accessories, adequate for the offered Laser System	One set
5	Laser Beam Expander (adequate for the offered Laser System) with accessories	One set
6	Laser Beam Steering Mirror (adequate for the offered Laser System) with Mounts and accessories, for steering the laser beam vertically into the atmosphere	One set
Other Requirements:		
7	Installation, Testing and Commissioning	One time
8	Warranty for all the offered items	Minimum 1 year
9	(i) Non-comprehensive AMC (after the warranty period) for the laser system and laser chiller (ii) List & quantity of spares and consumables for operation of the laser system and laser chiller for 5 years at 2500 hours/year during the AMC period.	5 years

*Detailed specifications for all the indented items are given in Tables 1-6

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Table1: Technical specifications of High-Energy Laser System

No.	Parameter	Specification	Remarks to Party
1	Application	To be used as a laser transmitter of a lidar system for atmospheric profiling	Provide details of specifications including make and model
2	Type of the laser	High-energy, Pulsed, Flash-lamp pumped, Q-switched, solid state laser	Provide details of the offered laser
3	Pulsed Laser Source	Nd:YAG	Provide details
4	Emitting wavelength	532 nm	Provide value
5	Wavelength Separation Package	Suitable Wavelength Separation Package for operating at 532 nm, including the Harmonic Generator	Provide details
6	Average Energy per pulse at 532 nm	≥ 800 mJ	Provide the value for the offered laser
7	Average Power at 532 nm	≥ 24 Watt	Provide the value of average power at 532 nm, and the Pulse Repetition Frequency (PRF) for the offered laser
8	Pulse Width at 532 nm	5 - 10 ns	Any value within this range is acceptable. Provide the value for the offered laser.
9	Power drift at 532 nm	≤ 6% for 8 hours of operation	Provide the value for the offered laser.
10	Energy Stability at 532 nm	Better than ±4% (shot-to-shot stability)	Provide the value for the offered laser.
11	Beam diameter at 532nm	10 ± 2 mm	Provide the value for the offered laser.
12	Beam divergence (Full angle) at 532nm	≤ 0.5 mrad at full angle for 1/e ²	Provide the value for the offered laser.
13	Beam pointing stability at 532nm	≤ ±40μrad	Provide the value for the offered laser.
14	Beam spatial profile (Fit to Gaussian)	Better than 0.7 in the near field (<1m) and better than 0.95 in the far field (∞), and least square fit to Gaussian profile	Gaussian profile is mandatory (Hat top profiles are not acceptable). Provide the details of the Gaussian beam profile for the offered laser, including the sample burn paper patterns. The beam patterns should not display "hot spots" at 532 nm.
15	Polarization at 532 nm	Linear polarization with purity ≥ 99%	Provide the details of laser polarisation (vertical or horizontal) including degree of polarization (%) at 532 nm.
16	Line width at 532 nm	≤ 1cm ⁻¹ (unseeded)	Provide the value of linewidth in cm ⁻¹ .

17	Temporal Jitter	± 0.5 ns or better (unseeded)	Provide the value for the offered laser.
18	Warranted Lamp Lifetime	~30 million shots or higher	Provide the value for the offered laser.
19	Laser control system	<p>Adequate control system for laser control, data acquisition and power meter measurements, with display unit for data visualization, and provision for hard copy generation of laser beam characteristics.</p> <p>The system should have pre-installed laser control software, suitable for Windows OS, with remote module / ethernet / RS232 / USB interface for laser control.</p> <p>The system should be rugged enough for continuous daily operation.</p>	Provide details of offered system and its interface.
20	Laser sync signals	<p>Laser has to generate the sync signal / trigger pulse which will be used for driving the lidar data acquisition system, having a 1 kilo-Ohm input impedance.</p> <p>The offered laser should produce a positive trigger pulse that exceeds +2.5V amplitude (better +3.3V...+5V) for more than 150 ns, and drive the required 1 kilo-Ohm input impedance. Rise time of the trigger pulse should be less than 20 ns.</p>	Provide the details of laser trigger/sync signals for the offered laser, and confirm the compliance with the trigger requirements stated.
21	Dimensions of Laser Head	As compact as possible is preferred	Provide details of dimensions and weight.
22	Power supply	Suitable Laser Power Supply should be provided, with all the necessary cables and connectors. Laser head must have detachable umbilical cord from the power supply.	Provide details of dimensions and power requirements.
23	Electrical Power requirements	Suitable to Indian power conditions (220 V, 50 Hz)	Provide the electrical power requirements for the installation and operation of the laser system.
24	Laser Accessories	All essential laser accessories such as burn papers, safety goggles, gloves, etc., should be provided	Provide list and quantity of accessories.
25	Heritage of Lasers supplied for atmospheric lidar application	Offered system should have proven track-record for atmospheric lidar applications at reputed institutions, where same or higher version lasers are installed	Give supporting documents such as previous POs.