

Appendix 1 – Pulsed Laser Specifications

Short description:

The laser consists of two pulsed (Q-switch) Nd-YAG laser heads together with beam combining optics suitable for generation of two short (250ns steps) pulses of light at a maximum repetition frequency of 20Hz.

Detailed Specs (based on the Ekspla User Manual [Eks97]; extract only):

Laser Type	Pulsed Nd: YAG Laser (NL301-2G)
Manufacturer	Ekspla Experimental Lasers Ltd., Vilnius, Lithuania
Wavelength	Internal 1064nm (infrared); frequency doubled using a KTP crystal with ~60% conversion efficiency → 532nm (green) output.
Pulse duration	3...5 ns
Pulse energy	Up to 150mJ per pulse; originally 100mJ; both heads upgraded during repairs. ¹
Pulse separation	-7.5ms...7.5ms in 250ns steps
Rod diameter	6.3mm (roughly equivalent to the initial beam diameter). ²
Repetition rate	20Hz; for stability reasons the flashlamps must run between 19.5-20.5Hz. ³
Intensity profile	Super-Gaussian (near field). ⁴
Flash lamp lifetime	> 10 ⁶ pulses
Polarisation	horizontal
(Grid-) Power	≤2.5 kVa
Cooling	Water; ≤8 l/min; pressure 2-4 bar (heat exchanger built into the power supply); inlet water temperature ≤20°C ⁵

1 Note: Avoid operating at more than 100mJ as the light sheet was designed for 100mJ.

2 The beam tends to diverge (<0.7 mrad according to the specification).

3 The actual laser flashes (generated by Q-switching) can be chosen to occur at any frequency of which 20 is an integer multiple (i.e. 1Hz, 2Hz, 4Hz, 5Hz and 10Hz).

4 The intensity profile changes with increasing beam distance from the laser.

5 Will also work at higher inlet temperatures, but not recommended.