



PERFORMANCE SPECIFICATIONS¹

WAVELENGTH COVERAGE

See opposite side for available wavelengths.

CW PERFORMANCE²

Power	Depends on wavelength, typically >100 mW
CW Linewidth	≤100 MHz
Wavelength Drift	≤0.5 cm ⁻¹ /8 hr

Current Modulation

Bandwidth	DC to 1 MHz
Amplitude Depth	>50%
Frequency Depth	~0.05 cm ⁻¹

PULSED PERFORMANCE

Pulsed Linewidth	≤1 cm ⁻¹
Peak Power	Depends on wavelength, typically >100 mW
Minimum Average Power	Depends on wavelength, typically >5 mW
Power Variation	<2% rms
Pulsewidths^{3,4}	40-500 ns
Repetition Rate^{3,5}	0.1-100 kHz
Max Duty Cycle	5%

OVERALL PERFORMANCE

Operation Mode	Pulsed or cw ²
Scan Types Supported	Uni- and bi-directional sweeps, step scanning
Maximum Tuning Speed	≥100 cm ⁻¹ /s
Wavelength Display Accuracy	±1.5 cm ⁻¹ (unidirectional)
Display Repeatability	≤0.02 cm ⁻¹
Beam Divergence	<5 mrad
Beam Pointing Stability	<1 mrad over 100 cm ⁻¹ of tuning
Polarization	Linear, Vertical, 100:1
Beam Spatial Mode	TEM ₀₀
Beam M²	≤1.3
Spot Size	<2.5 mm (1/e point)
Beam Waist	30-50 cm from exit port

CONTROL SPECIFICATIONS

Control Interface	1002-TLC Controller
Pulse Triggering	Internal or external trigger, external pulse input
Scan Triggering	External wavelength step and scan start
External Control Interfaces	USB 2.0, GPIB, RS-232

OPERATING SPECIFICATIONS

Operating Temperature Range	15-35 °C
Cooling (pulsed)	Passive air
Cooling (cw)	Water
Power Requirements	100-240 VAC, 50-60 Hz, single phase

MECHANICAL SPECIFICATIONS

Head Dimensions	5.50 x 3.45 x 3.31 inches, L x W x H
Controller Dimensions	10.51 x 8.50 x 4.00 inches, L x W x H

- All specifications subject to change without notice.
- Some wavelengths only available in pulsed operation.
- Some gain chips can support longer or shorter pulsewidths, higher repetition rates, and/or duty cycles. Contact factory for your specific needs.
- 20 ns increments.
- 0.1 kHz increments.



Daylight Solutions CW-PLS lasers provide true cw performance and pulsed operation.

We continue to evolve the world's first broadly tunable mid-IR lasers based on quantum cascade technology. Center wavelengths span the mid-IR spectrum from 3.5 - 12 μm and now provide continuous tuning of up to 120 cm⁻¹. CW-PLS lasers operate in both pulsed and CW modes. This laser has been designed for applications requiring high wavelength stability and broad tunability as well as narrow linewidth. The new HFQD control electronics (High-Fidelity QCL Drive) allow for increased repetition rates and longer pulses while providing more protection for the gain chip. HFQD also includes an improved modulation circuit offering wider bandwidth of modulation frequencies from DC to 1 MHz. More wavelength coverage, more flexibility, more robust – the new CW-PLS system from Daylight Solutions.

Designed by the world's leading experts in tunable ECqCL™ (External Cavity quantum cascade Lasers), these sources are small, robust, and utilize patented miniature lenses to optimize system performance. Optimization of thermal management allows these systems to be air-cooled for pulsed operation and water-cooled for CW operation. There is no need for cryogenic cooling.

Each tunable laser is shipped with an intuitive, easy-to-use, multifunction controller. Essentially all functionality is available through the intuitive front panel, or the laser can be controlled by a PC through RS-232, GPIB, and USB interfaces. This allows the highest flexibility of control for a variety of applications.

Daylight Solutions' system designs leverage the last 15 years in tunable laser development and manufacturing, and incorporates the company's latest patented* tuning and packaging technology for the mid-IR.

Robust, easy-to-use tunable lasers in the 3.5-12 μm region of the spectrum are now a reality. These lasers enable research in the fields of molecular detection and imaging, including applications such as industrial process control, the detection of biomarkers in the breath, cellular imaging, and the detection of chemical and biological agents.

Daylight Solutions' mid-IR laser platform technology opens up the mid-IR to all researchers—today.

CW-PLS Lasers

- Expanded tuning range, repetition rate, pulse width, and duty cycles
- CW or pulsed operation
- Expanded modulation functionality
- Accurate wavelength set
- Low wavelength drift
- High-power
- No cryogenic cooling

Daylight Solutions, The Source for all Applications in the Mid-IR

Call today for pricing and availability of specific wavelengths.

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*This product may be covered by one or more of U.S. Patent Nos.: 7,424,042; 7,466,734; 7,492,806; 7,535,656; 7,535,936; 7,733,925; 7,796,341; 7,826,503; 7,873,094; 8,027,094; 8,050,307.

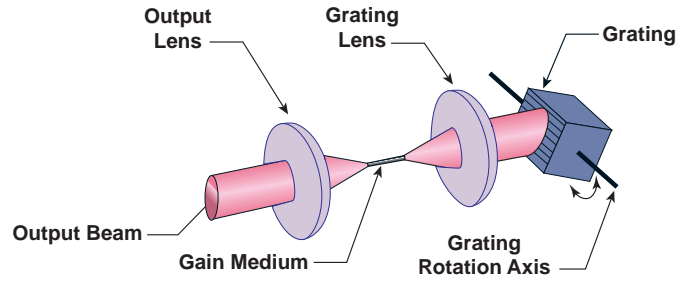


Reference Performance and Function: Tunable CW-PLS Laser

2006 PhAST/Laser Focus World
**Innovation Award
Winner**

TUNING RANGES FOR SPECIFIC MODELS

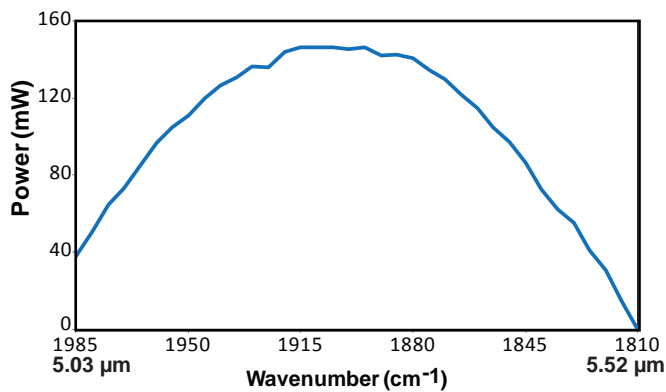
Model No.	Nominal Ctr Wavelength (μm)	Guaranteed Tuning Range (cm^{-1})	New Performance
TLS-41036	3.55	70	✓
TLS-41038	3.8	80	✓
TLS-41040	4	80	✓
TLS-41042	4.2	70	✓
TLS-41045	4.5	120	✓
TLS-41047	4.7	70	✓
TLS-41049	4.95	70	✓
TLS-41052	5.2	110	✓
TLS-41058	5.8	110	✓
TLS-41060	6.05	110	✓
TLS-41062	6.2	110	✓
TLS-41074	7.4	100	✓
TLS-41078	7.8	80	✓
TLS-41090	8.9	80	✓
TLS-41096	9.5	60	✓
TLS-41105	10.4	60	✓



Cavity Design for ECqCL™

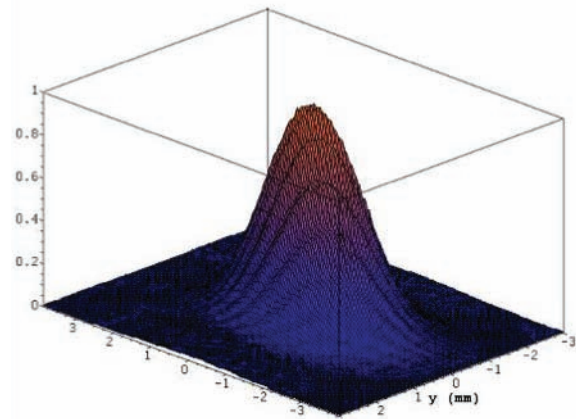
- Grating rotates for wavelength tuning
- Select single wavelength or scan continuously

CW Output Power at 5.25 μm

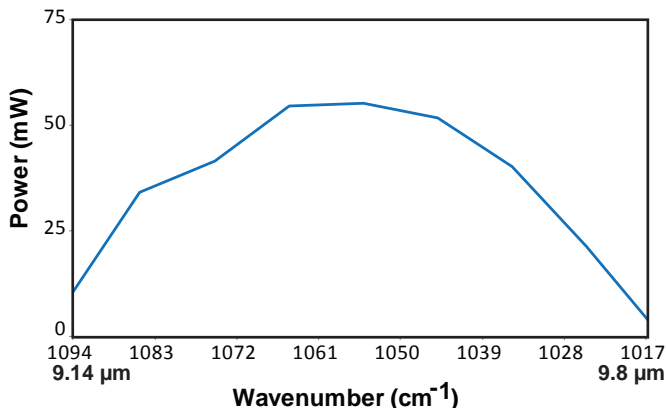


Typical tuning curve for TLS-41052¹.

Beam Profile — M^2 Typical 1.3

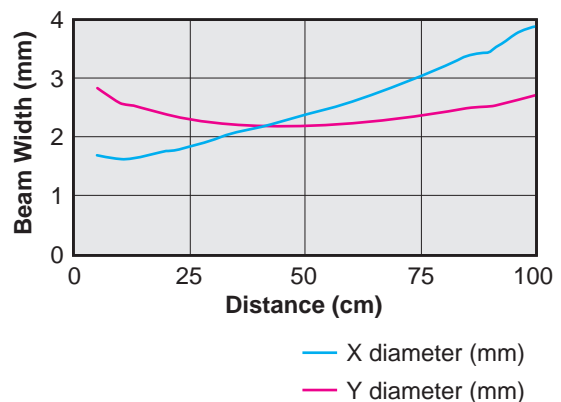


CW Output Power at 9.5 μm



Typical tuning curve for TLS-41096¹.

Beam Propagation — Typical



¹Contact factory for performance at your target wavelength.

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