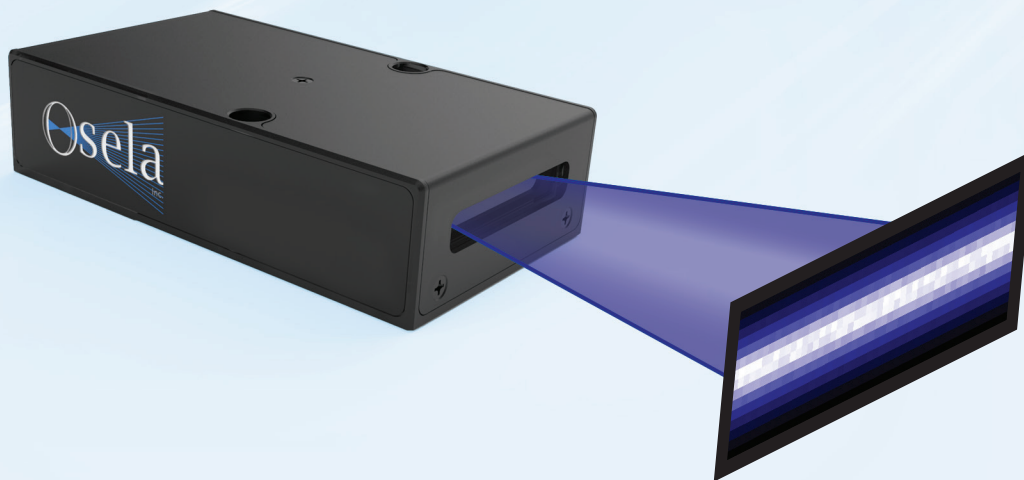




STRUCTURED LIGHT AND
LASER BEAM SHAPING SOLUTIONS

SIGMALINE LASER

Next generation laser line projector offering reduced speckle noise with exceptional straightness and optimized safety class for high precision machine vision applications.



FEATURES

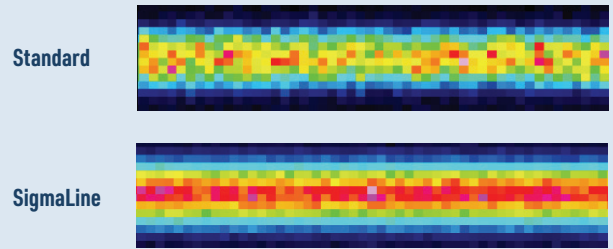
- Patented speckle reduction technology
- Near-perfect laser line straightness
- Increased output power for a given safety class
- Multi-angular incidence illumination for challenging imaging of reflective surfaces
- Electrically efficient solution with no moving parts
- High focusing quality

INTRODUCTION

The SigmaLine Laser represents the next generation of illumination technology for machine vision applications. Osela's patented design delivers multiple advantages over conventional laser line projectors, providing superior performance needed for high resolution sensors.

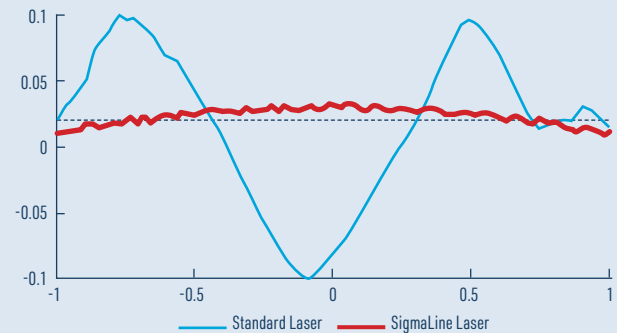
SPECKLE REDUCTION TECHNOLOGY

Osela's patented speckle reduction technology cuts speckle noise by up to 70% with no moving parts. This allows for more accurate optical data capture while maintaining high reliability.



STRAIGHTNESS: NEAR-PERFECT LASER LINE

Projects laser lines with less than 0.01% deviation from best-fit line over length, allowing for higher accuracy and precision in 3D machine vision systems.



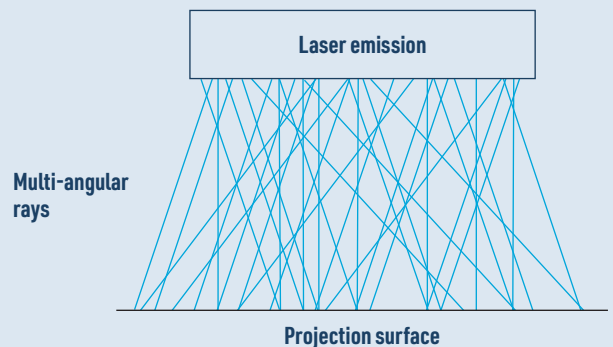
SAFETY CLASS: MAXIMIZING OUTPUT FOR A GIVEN

The unique optical design of the SigmaLine Laser allows for significant gains in output power for a given safety class.



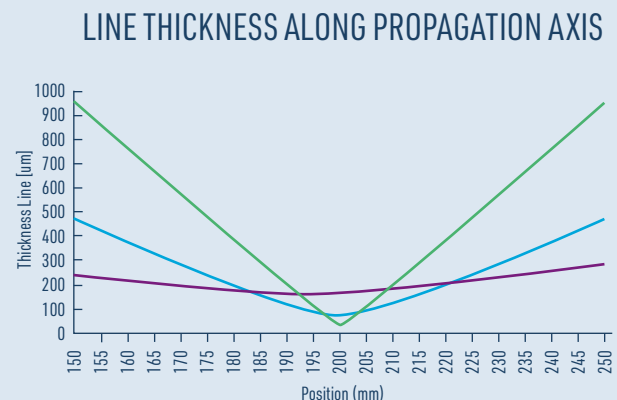
SCATTER: MULTI-ANGULAR INCIDENCE PROJECTION

The multi-angular illumination along the laser line allows for enhanced light capture, particularly useful for imaging shiny surfaces.



SHARP: HIGH QUALITY FOCUSING PERFORMANCE

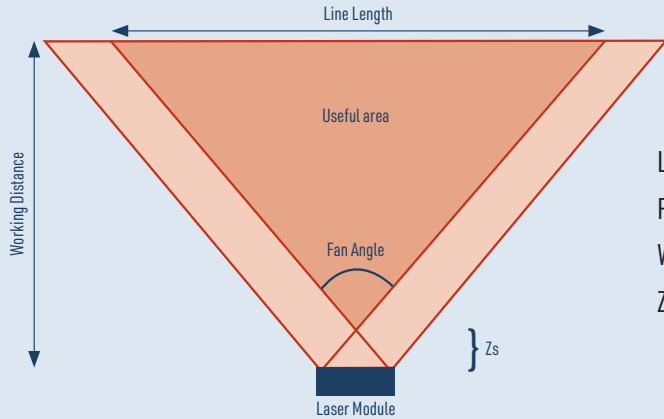
Osela's patented purely optical design allows for sharp, well-defined laser lines at the focal plane and within the depth of field. Multiple diffraction limited focusing performance options are available.



LASER LINE PROJECTION CHARACTERISTICS

Osela's SigmaLine Laser has the unique advantage of illuminating the target from multiple angles for any given location along the line. Many configurations can be made available to meet application requirements based on characteristics below.

DETERMINING EFFECTIVE LINE LENGTH



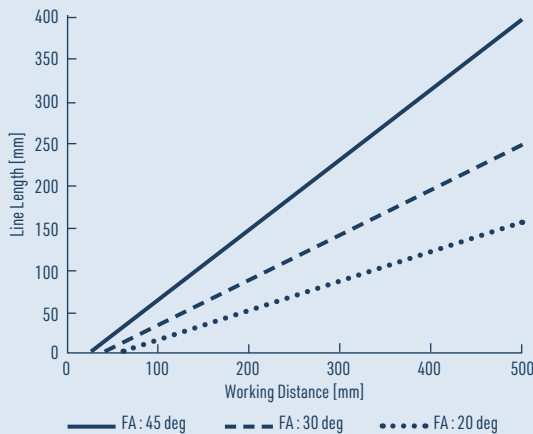
$$\text{Line Length} = 2 * \tan\left(\frac{\text{FA}}{2}\right) * (\text{WD} - \text{Zs})$$

LL = Effective Line Length
 FA = Fan angle of projection
 WD = Working Distance
 Zs = FA start point

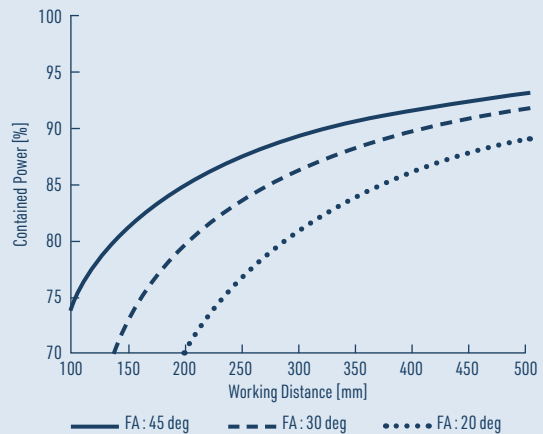
FA [DEG]	Zs [mm]	AVAILABLE WD OPTION [mm]
20	61	200, 300, 500
30	40	150, 200, 300, 500
45*	26	100, 150, 200, 300, 500

*only available at 660nm, call for 450nm.

LINE LENGTH AT WORKING DISTANCE

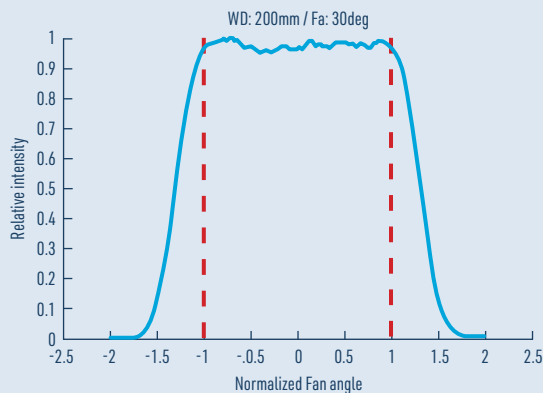


CONTAINED POWER WITHIN LINE LENGTH AT WORKING DISTANCE



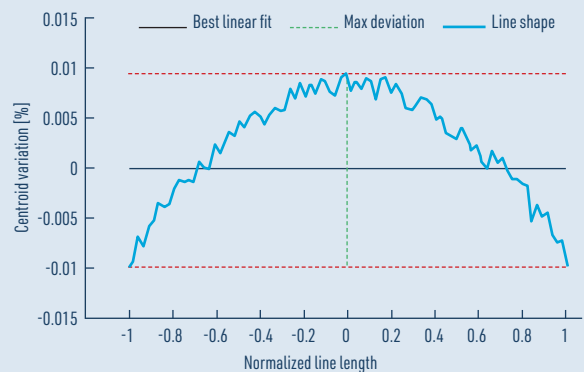
TYPICAL LINE UNIFORMITY AND STRAIGHTNESS PERFORMANCE

OPTICAL INTENSITY UNIFORMITY ALONG LASER LINE



SPECIFICATIONS	VALUES
Uniformity	$\frac{I_{max} - I_{min}}{I_{max} + I_{min}} \leq 25\%$

LASER LINE STRAIGHTNESS

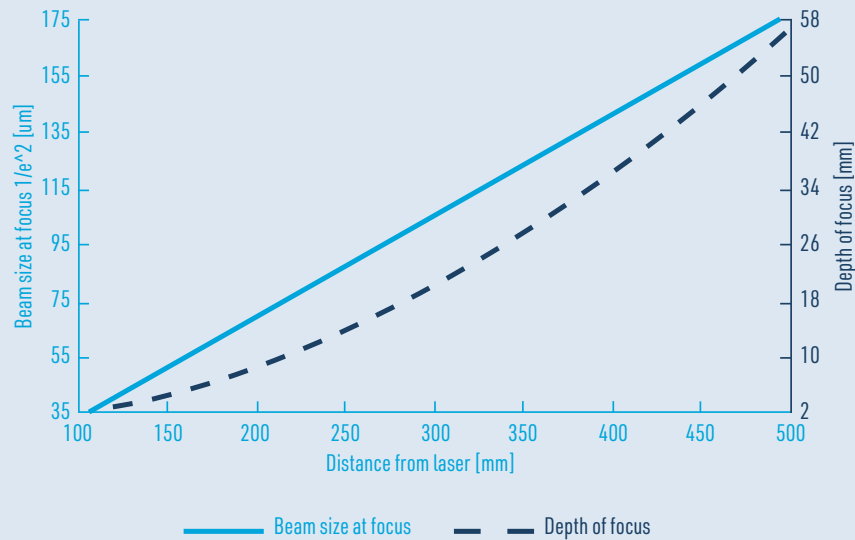


SPECIFICATIONS	VALUES
Straitghtness	$\frac{\text{max deviation}}{\text{Line Length}} \leq 0.01\%$

LASER DIODE MODELS AND FOCUSING OPTIONS

At Osela, we provide many different focusing options giving you the flexibility to choose the one that best suits your application. The SigmaLine Laser has the unique capability of diffraction limited focusing for a speckle reduced solution. From the graphs below, note the beam size and depth of focus (DOF) values and then multiply by the K constants for the laser diode model and focus option of choice (A2, B2, D2, E2, or Q)

Example: From the graphs at 400mm distance, Focus = 140um, DOF 36mm. For laser model 450nm 60mW, the line thickness for focus option A2 will be 104um (140um x 0.74). The depth of focus will be 31.3mm (36mm x 0.87).



DIODE MODEL				FOCUSING & DOF CONFIGURATION AND CONSTANT									
WAVELENGTH (NM)	OUTPUT POWER (mW)	WAVELENGTH TOLERANCE (nm)	OPERATING CURRENT (mA)	A2		B2		D2		E2		Q	
				K_{FOCUS}	K_{DOF}	K_{FOCUS}	K_{DOF}	K_{FOCUS}	K_{DOF}	K_{FOCUS}	K_{DOF}	K_{FOCUS}	K_{DOF}
405	80	+10/-5	150	0.75	1.06	1.58	4.78	1.08	2.24	2.30	10.11	0.48	0.44
450	60	+10/-10	100	0.74	0.87	2.21	7.66	1.08	1.84	3.21	16.20	0.48	0.36
	700*	+10/-10	1500*	0.72	0.82	2.21	7.66	1.06	1.75	3.21	16.20	0.47	0.34
660	120	+5/-5	200	1.54	2.78	2.58	7.79	2.24	5.89	3.76	16.48	1.00	1.16

*Pulsed mode only, power may vary. Contact Osela sales representative.

MODULATION

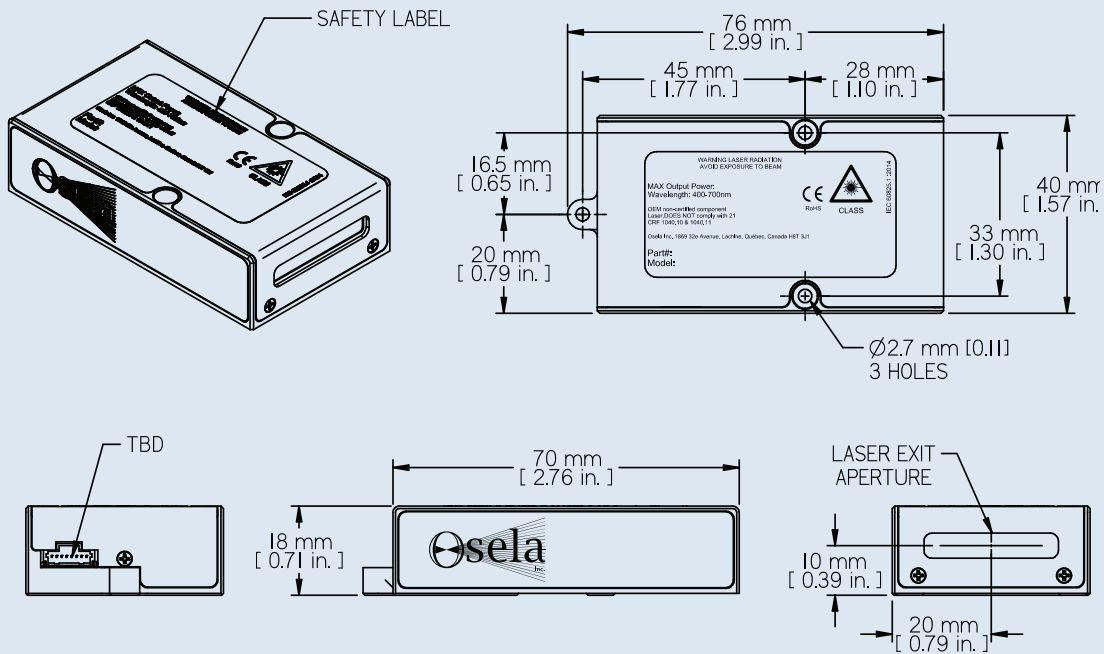
The SigmaLine Laser can be modulated by an external 0 to 5V signal through the white lead. "T" modulation is included by default.

FUNCTION	CODE	ON	OFF
TTL	T	0 to 2V	3V to 5V
Reverse TTL	RT	3V to 5V	0 to 2V

OPERATIONAL SPECIFICATIONS

Bore sight (mrad)	< 3 mrad
Wavelength Drift	< 0.25 nm/°C
Pointing Stability	< 6 μrad/°C
Modulation Rise/Fall time	< 5μ sec, 100% modulation depth (10 Kohm input impedance)
Protections (Built in)	ESD, Over voltage (up to 30 VDC), Over-temp Shutoff (> 50 deg C)
Long term Power stability (8 hours)	< 3 %, 2 minute warm up time
Operating Voltage	5 ± 0.5DVC, 4.5 to 30V Optional (9-30V for < 635 nm)
Working Temp Range	-10 to to +50 °C (housing)
Weight	< 80 g
Power Supply Cable	TBD
ESD Protection	Level 4
Shock Tolerance	30g, 6ms, functional

MECHANICAL SPECIFICATIONS



ORDERING CODE

Sig	XXX Wavelength	XXX Output Power	X Electronic	X Focusing Option	XX Fan Angle	XXX Focus Distance
	See table	See table	T	A2	20	100
			RT	B2	30	150
				D2	45	200
				E2		300
				Q		500

Last reviewed: 11-06-2025