Spitfire® Ace™

INDUSTRY LEADING POWER. MAXIMUM STABILITY.

The Spitfire Ace Advantage

- *Revolutionary Ace regenerative cavity design*
- *More than 8.0 W of output power*
- *Superior mode quality (M^2 <1.3)*
- *Digital synchronization electronics*
- *Supported by the most knowledgeable service team in the industry*

The Spectra-Physics Spitfire® Ace™ is our flagship amplifier system. It is the most technically advanced Ti:Sapphire regenerative amplifier commercially available. Equipped with our proprietary Ace cavity design, the Spitfire Ace provides guaranteed long term performance, low noise and reliable day-to-day operation. The result is consistent OPA performance and nonlinear wavelength conversion – a superior light source for use in the most demanding ultrafast applications.

The Spitfire Ace amplifier builds upon our highly successful Spitfire platform. Each component has been carefully evaluated and selected to maximize stability. The Spitfire Ace regenerative amplifier produces an industry leading average power of more than 7 W at 1 kHz and 10 kHz, and 8 W at 5 kHz with excellent beam quality.

The Spitfire Ace PA (Power Amplifier) extends the available energy output. The PA system produces more than twice the average power of the regen-only Spitfire Ace and offers up to >16 W average power. Thanks to the patented Ace cavity, the beam quality is excellent providing M^2 <1.45 even at the highest energy configuration.

The Spitfire Ace can be seeded using Spectra-Physics' wide range of ultrafast oscillators including Mai Tai® SP and Element™. The Mai Tai SP laser is a truly hands-free system that does not require alignment, cleaning or adjustments, and its specifications are guaranteed over an impressive 20°C temperature range. Element provides outstanding stability and can be equipped with Femtolock™ 2 to provide leading edge repetition rate stability of <100 fs jitter when synchronized to an external source.

The Spitfire Ace amplifier system is pumped with the new Ascend high power DPSS green lasers: Ascend 60 and Ascend 40. For highest power, the Spitfire Ace PA system is pumped using an additional Ascend 60 laser. The combination delivers more than 120 W of average power with exceptional beam quality. The low noise, DPSS design means high reliability and high performance.

The Spitfire Ace provides the most stable output available from any Ti:Sapphire regenerative amplifier making the Spitfire Ace ideal for pumping multiple OPA systems and driving a wide range of nonlinear spectroscopies. The Spitfire Ace can also drive the Kaliedescope™ which delivers pulses as short as <7 fs. Achieve new levels of performance with the Spitfire Ace.

Applications

- *Multicolor pump-probe spectroscopy*
- *Coherent control*
- *Nonlinear optics*
- *2D IR spectroscopy*
- *Four-wave mixing spectroscopy*
- *High harmonics generation*
- *Optical parametric amplification*
- *Material processing*

Spectra-Physics®
A Newport Company

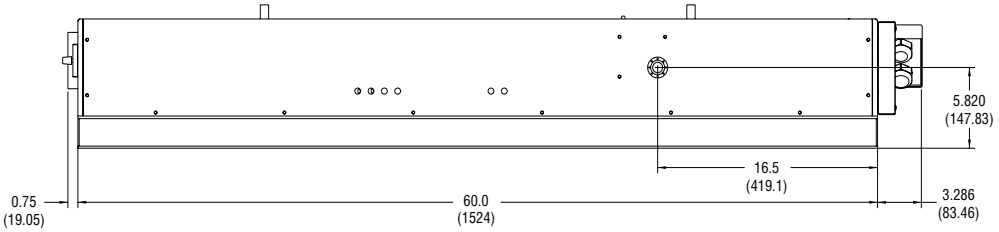
Spitfire® Ace™

Specifications[1,11]

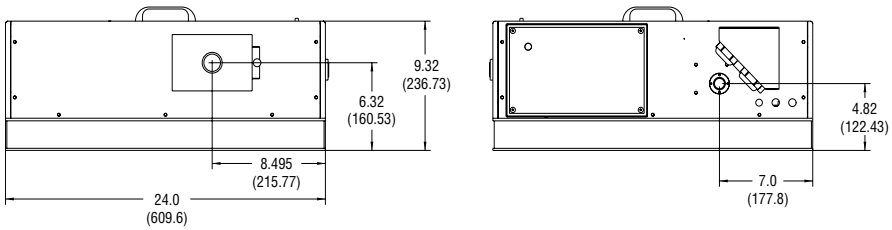
		SPFIRE ACE		
Output Characteristics				
Pulse Width[2, 3]		<35 fs – <120 fs; <2 ps[4]		
Repetition Rate[5]		1 kHz	5 kHz	10 kHz
Average Power[4]	Ascend 60:	>7.0 W	>8.0 W	>7.0 W
	Ascend 40:	>5.0 W	>6.0 W	>5.0 W
Pulse Energy	Ascend 60:	>7.0 mJ	>1.6 mJ	>0.7 mJ
	Ascend 40:	>5.0 mJ	>1.2 mJ	>0.5 mJ
Pre-Pulse Contrast Ratio[6]		>1000:1		
Post-Pulse Contrast Ratio[7]		>100:1		
Energy Stability		<0.5% rms over 24 hours		
Beam Pointing Stability		<5 µrad rms[8]		
Wavelength[9, 10]		795–805 nm	780–820 nm	780–820 nm
Spatial Mode		TEM_{00} (M^2 <1.3 on both axes)		
Beam Diameter (1/e²)		10 mm (nominal)		
Polarization		Linear, Horizontal		

1. Due to our continuous product improvements, specifications subject to change without notice. The specifications only apply when operated with recommended Spectra-Physics seed and pump lasers.
2. A Gaussian pulse shape (0.7 deconvolution factor) is used to determine pulse width (FWHM) from autocorrelation signal as measured with Newport PulseScout® autocorrelator.
3. For alternative pulse widths, please contact Spectra-Physics.
4. Specifications apply when pumped using Spectra-Physics Ascend 60 pump laser. The <2 ps option maximum power >5.0 W.
5. The desired optimum repetition rate can be specified at the time of purchase or additonal optics sets can be used to reconfigure the amplifier. Any system can be operated (with the same energy per pulse) at reduced repetition rates through internal divide-down electronics.
6. Defined as the ratio between peak intensity of output pulse to peak intensity of any pre-pulse that occurs >1 ns before the output pulse. For higher contrast ratio, please contact Spectra-Physics.
7. Defined as the ratio between peak intensity of output pulse to peak intensity of any pre-pulse that occurs >1 ns after the output pulse. For higher contrast ratio, please contact Spectra-Physics.
8. At constant temperature. Variable temperature specification <20 µrad/°C, peak-to-peak.
9. For wavelength extension through SHG, THG, FHG or OPA, please contact Spectra-Physics.
10. Performance specifications apply at peak of gain curve.
11. **The Spitfire Ace is a Class IV – High-Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.**

Spitfire Ace Dimensions



Side View, Seed Input Panel



Output End View **Pump End View**

Dimensions in inch (mm)

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