High Performance 30 Watt CO_2 Laser for Thin Film Cutting

The Synrad **vi30+** is designed, engineered, and built for Original Equipment Manufacturers (OEMs) seeking a reliable, compact 30 Watt CO_2 laser source. Outstanding power stability and beam quality ensures clean, crisp results while a new, upgraded RF module improves reliability.

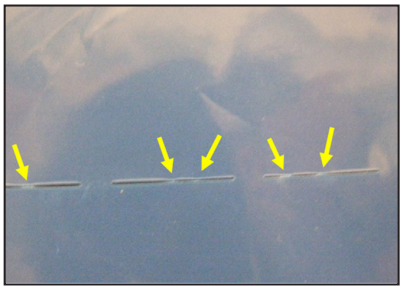
Overview

For more than 20 years, Synrad 30 Watt CO_2 lasers have been one of the most widely chosen CO_2 laser sources among OEMs and System Integrators worldwide. Used primarily as a laser source for marking and coding applications, the highly stable output power and beam quality has found its way into thin film cutting applications.

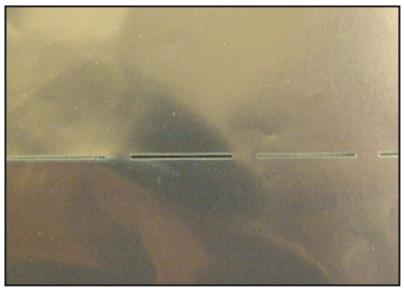
Thin Film Application/Process	CO_2 Laser Requirement
Through cutting, selective depth cutting, scoring, and perforating	~30 Watts average power
Process a range of materials including PET, OCA, polarizers and thin plastics	Multiple wavelength options – 9.3 µm, 10.2 µm, and 10.6 µm wavelengths. Contact Novanta Application Labs to determine optimal wavelength
Cutting at consistent depths	Stable power output and beam profile
Consistent cutting with clean, straight edges	Stable power output, high beam quality, and fast rise/fall times to minimize heat affected zone

The Effects of Power Stability on Cutting Thin Films

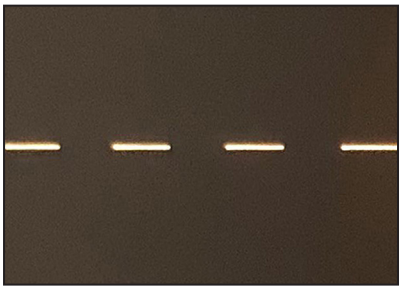
Poor cut quality leads to higher levels of waste and lost productivity, increasing production costs and lowering profitability. The images below demonstrate the effects of power stability on cutting thin films. Poor power stability causes fluctuations in the laser power, yielding inconsistent results.



The yellow arrows indicate areas where the cuts did not penetrate through the thin film.



In this example the center cut goes completely through the thin film, while the other cuts did not penetrate through.



In this example the thin film was cut using a Synrad vi30+, yielding clean, consistent cuts.

©2021 Novanta Corporation. All rights reserved.

Synrad vi30+ Feature	Specification or Typical Performance	Resulting Benefit for Film Cutting Systems
Compact, lightweight	427 x 89 x 139 mm and 6.5 kg. OEM/air-cooled model can be configured for side or rear cooling	Small size ideal for integration into compact OEM laser systems
Efficient	Maximum power consumption guaranteed <480 W, typically around 380 W	Minimal cooling requirements, low power consumption, low total cost of ownership
Stable power output from cold start	Power stability from cold start guaranteed < 5%, typically better than 3%	Consistent cutting performance at machine start and stop times
Stable power output at elevated temperatures	Stable power output in ambient temperatures up to 40ºC	Consistent cutting performance in high volume factories and industrial settings
Stable power output low duty cycles	Power stability typically better than 5% down to 10% duty cycle	Large dynamic range to support processing a variety of materials, thicknesses, and cut types
Excellent beam quality	No side lobes, M^2 guaranteed < 1.2, ellipticity typically about 1.03	Gives smallest possible focused spot size; ensures consistent cut behavior in X or Y axis of travel
Stable beam divergence	Synrad waveguide technology prevents unstable beam profiles, divergence stability typically about 3%	Ensures consistent laser focus behavior for static cut kerf widths in the film
Responsive on/off pulsing	Guaranteed rise and fall times <100 Qs, rise time typically about 35 µs, fall time typically about 75 µs	Prevent discoloration at cut edges

Avoiding Common CO_2 Laser Selection Pitfalls

To avoid poor power stability:

- Ask for a power stability specification that includes measurements from cold start. Some laser vendors only report power stability after a significant warm-up time.
- Look at the formula used to calculate power stability. The variation in power should be scaled by the sum of the minimum and maximum power measured. Some vendors scale the variation by 2x the maximum power, making the stability appear better than you would measure on your system.
- Request information on power stability at the power level needed to process your material. Some vendors ship lasers with power stability worse than 50% at low duty cycles.

To avoid poor and/or unstable beam quality:

- Ask about thermal gradients in the laser design. Strong thermal gradients cause instability that may cause the beam profile and/or power to fluctuate over time. Some vendors have lasers where the divergence can vary as much as 22%, which will cause a significant change in spot size and process quality.

Interested in speaking to one of our knowledgeable representatives?

Americas & Asia Pacific
Novanta Headquarters
Bedford, USA
P +1-781-266-5700
Photonics@Novanta.com

Europe, Middle East, Africa
Novanta Europe GmbH
Wackersdorf, Germany
P +49-9431-7984-0
Milan, Italy
P +39-039-793-710
Photonics@Novanta.com

China
Novanta Sales & Service Center
Shenzhen, China
P +86-755-8280-538
Suzhou, China
P +86-512-6283-7080
Photonics.China@Novanta.com

Japan
Novanta Service & Sales Office
Tokyo, Japan
P +81-3-5753-2460
Photonics.Japan@Novanta.com

©2021 Novanta Corporation. All rights reserved.