

# APPLICATION NOTE

# NanoFoil® Laser Cutting Parameters



## Introduction

To cut **NanoFoil®** with a laser, you should use a low-wattage/power-pulsed laser (5–15 watts) with a wavelength approximately 1000nm, cut by making multiple passes along the cut pattern, removing the material by layers. By removing layers at a time, the laser does not build up the necessary localized heat that could activate the **NanoFoil®**.

## Equipment

- Yttrium-Based Lasers
  - 8 Watt MD-V9900 YVO<sub>4</sub> Laser Marker
  - YAG Laser
- UV-Based Laser
  - Coherent AVIA – 355-14W Laser

*\* Note: CO<sub>2</sub> lasers have been tested and have too much power to work with the **NanoFoil®**.*

The following settings are based on experimentation.

Settings	8 Watt MD-V9900 YVO <sub>4</sub>		Coherent AVIA – 355-14W
NanoFoil® Type	NF40	NF40S10	NF40
Power	70–80% of max	70–80% of max	100% of max
Wavelength/ Frequency	45KHz	38KHz	355nm
Pulse Width			40 nanoseconds
Integrated DC Energy			2.2 watts
Pulse Energy			20 microjoules
Lens Focal Length			100mm
Spot Size			15µm
Repetition Rate			160KHz
Travel Rate	.03m/seconds	.03m/seconds	2m/seconds
#Passes	350	350	25

## Details and Settings

- Use a pulsed laser. The frequency affects the edge quality so you may want to experiment to optimize your process.
- To avoid local heating, start Galvo Mirrors scanning prior to turning on the beam and ensure that there is minimal overlap between pulses.
- Drive air flow over the part and vacuum the surface locally.
- Avoid movement or rippling of the **NanoFoil®** as this could cause activation. It is recommended that you hold the **NanoFoil®** or use a vacuum table or tape it down.
- If the foil is not 100% cut, you can scribe or score the foil so you can separate the part from the surrounding foil.

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