



Model 650M/CD to Cut Thin Metal

The Series 600 Pulsed Nd:YAG Lasers were developed by Lee Laser specifically to cut thin metal parts with a high level of dimensional precision. The Model 650M/CD has become a popular laser for the manufacture of two products in widely divergent markets:

- Stencil Masks to apply resistive and conductive pasts to surface mount substrates
- Medical Stent devices for use in balloon angioplasty

Stencil Masks

Stencils are thin masks, typically of stainless steel, that are used to apply conductive pasts onto ceramic substrates for surface-mount circuits. The thickness of the stencils may differ from as little as 150 microns up to 1 mm. Lee Laser is selling many of our Model 650M/CD, Pulsed Nd:YAG Lasers for this application.

Rated at 50 Watts average power, the 650M/CD exhibits exceptional beam quality (beam diameter and beam divergence) that is necessary for efficient cutting of stencil masks. Easily adjustable front panel controls permit a wide range of performance capability:

- * Average power up to 50 Watts
- * Pulse energy up to 200 mJ (Watt-seconds)
- * Pulse width selectable from 50 to 200 μ s
- * Pulse rate greater than 2000 pps

The very short pulse width is highly effective in eliminating any heat affect zone (HAZ) that is associated with the micro-drilling or micro-cutting.

Optically isolated interface circuitry permits computer control of laser operation.

For very fine cutting and drilling applications such as is required to cut thin stencils, the 650M/CD is supplied with an intracavity *mode-selecting aperture* that is used to limit the beam to low-order transverse modes of operation. By using the mode-selecting aperture, the 650M/CD can produce beam focus spot diameters as small as 20 μ m.

The specific performance parameters that are required to cut various thin metals depend on many variables such as type and thickness of material, and desired cutting speed. The 650M/CD has been reported to cut steel material as thick as 2.0 mm, at a cutting speed of 80 mm/min.

Medical Stents

To cut medical stent devices requires a much higher level of precision and finesse. Stents typically measure only a few millimeters in diameter, and have 100-125 μm wall thickness. Therefore, the laser requirements are very modest.

The laser performance parameters listed below are typical for this application:

Average Power	5-10 Watts
Pulse Rate	700-1000 pps
Pulse Width	50-100 μs
Pulse Energy	5-10 mJ