

7/14/2014

AdChem Corporation  
1215 Windemere Cir  
Gurnee, IL 60031

ATTN: Pam Fardelos

Dear Pam,

Thank you for the opportunity to demonstrate a laser cutting process on a variety of adhesives for the Adchem Corporation. We were able to successfully develop parameters on the 5 adhesives over all of our available wattages. A detailed description of the system, the methods and the results are provided below.

All samples were processed using the Universal Laser Systems PLS6.150D, with a 30, 75, and 150 watt CO<sub>2</sub> lasers and a 2.0 lens. The following unique features from Universal Laser Systems were used in order to optimize the laser processing performance for your application:

**Air Assist with Optics Protection:**

Air Assist is available in "Cone" and "Backsweep" configurations. In the cone configuration, compressed air is directed along the path of the laser beam. The cone protects the laser optics and is also helpful when processing flammable materials. In the backsweep configuration, compressed air is directly tangential to the work surface. The backsweep is useful for removing solid residues when cutting or engraving certain polymer materials.

**Honeycomb Cutting Table:**

The Honeycomb Cutting Table is designed to maximize air flow through the work piece during laser cutting and also to minimize laser reflection back onto the work piece.

The various adhesives were simply laid on the cutting table prior to processing. Steel coupons were laid on the pieces to keep the pieces from moving from the exhaust flow. A complex spacer graphic was used to quantify the cutting process.

Example process settings that were used for each sample are listed in the table below:

PLS6.150D, 30 Watt CO<sub>2</sub> Laser, 2.0 Lens

Sample	Process	Power	Speed	PPI <sup>1</sup>	ID <sup>2</sup>	VP <sup>3</sup>	IE <sup>4</sup>	Time
653-74-54	Vector	100%	24%	500	5	Standard	Disabled	53 sec
654M-74-54	Vector	100%	20%	500	5	Standard	Disabled	53 sec
654T-74-54	Vector	100%	20%	500	5	Standard	Disabled	53 sec
652-74-60LL1484	Vector	100%	24%	500	5	Standard	Disabled	53 sec
655-74-54-LL1513	Vector	100%	20%	500	5	Standard	Disabled	53 sec
256M-74	Vector	100%	25%	500	5	Standard	Disabled	53 sec
2019M-74	Vector	100%	17%	500	5	Standard	Disabled	54 sec
3175M-60	Vector	100%	23%	500	5	Standard	Disabled	53 sec
6181-60	Vector	100%	15%	500	5	Standard	Disabled	55 sec

6403-12PT	Vector	100%	20%	500	5	Standard	Disabled	53 sec
EFTB-60	Vector	100%	15%	500	5	Standard	Disabled	55 sec

- 1 PPI is the number of laser pulses per inch for vector marking.
- 2 ID is the Image Density for raster engraving.
- 3 VP is the Vector Performance. It can be set to optimize for quality or throughput.
- 4 IE is the group of settings for Image Enhancements.

All of the adhesives cut very well across all wattages, with minimal discoloration or heat affected edge. Air assist should be used to eliminate any flaming during processing. Figures 1-11 are the adhesives in the order listed in the table above.

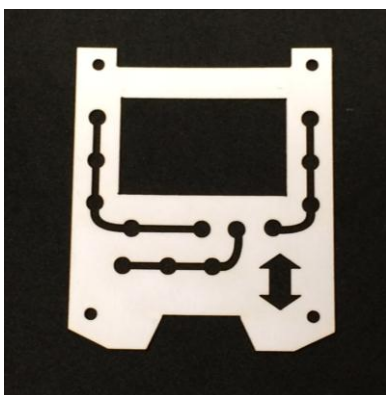


Figure 1: 653-74-54

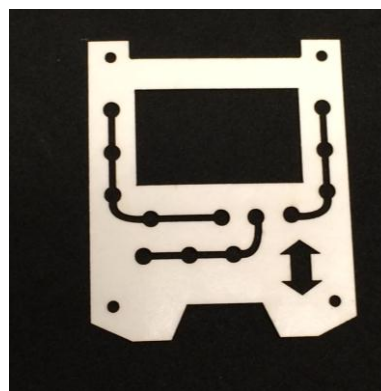


Figure 4: 654M-74-54

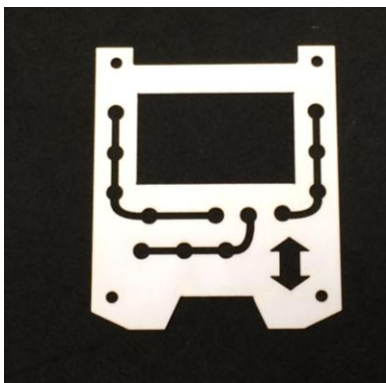


Figure 2: 654T-74-54

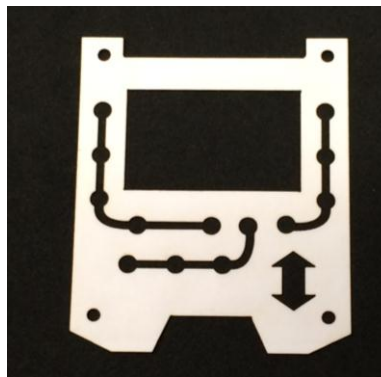


Figure 5: 652-74-60LL1484

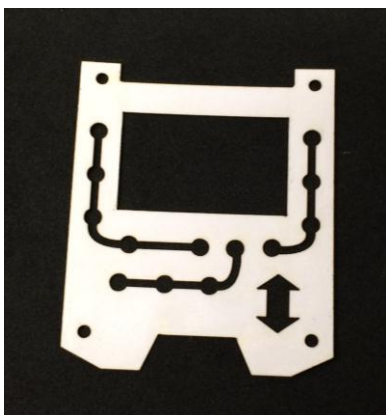


Figure 6: 655-74-54-LL1513

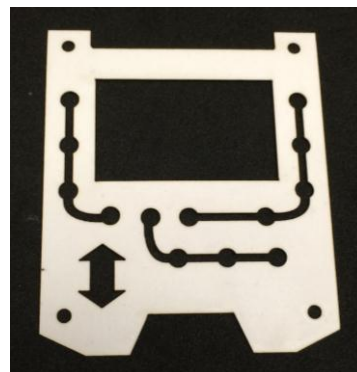


Figure 7: 256M-74

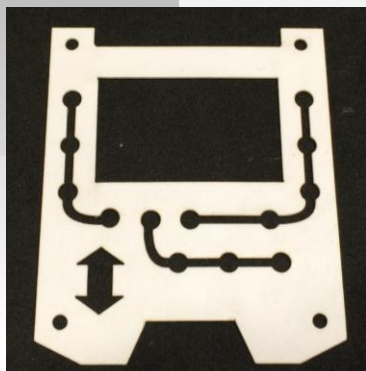


Figure 8: 2019M-74

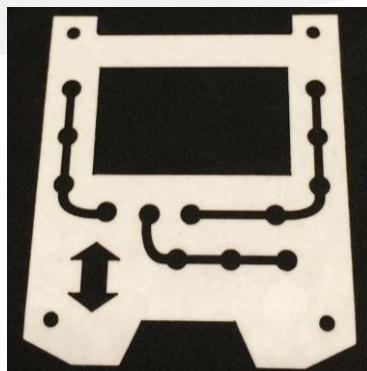


Figure 9: 3175M-60

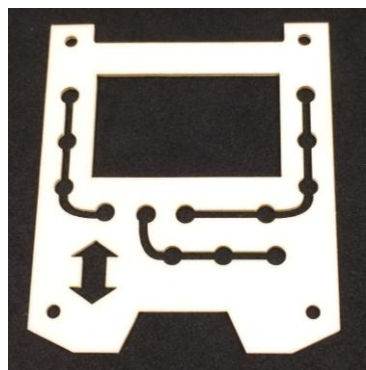


Figure 10: 6181

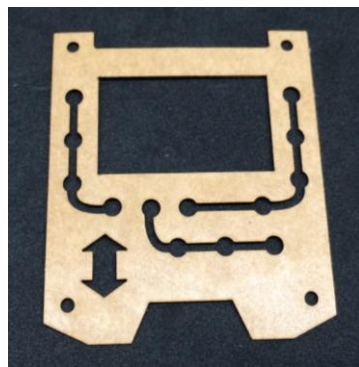


Figure 11: 6403-12PT

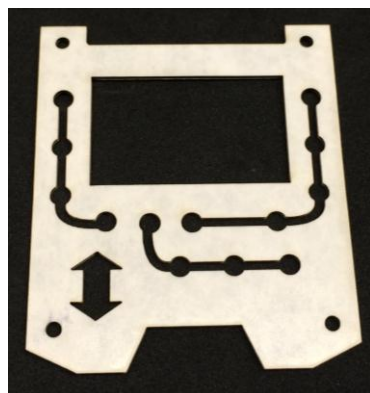


Figure 12: EBTB-60

The eleven adhesives will be added to our materials database for customers to take advantage of. The completed samples are being sent to you by UPS and a copy of the tracking report will be forwarded to you as soon as it is available. After reviewing the material, if you have any questions please call me at 1-800-859-7033.

Sincerely,

Manny Oropeza