

E4 METAL SHOP

CNC PLASMA CAM

FAQ...

What is Plasma Cutting?

Plasma cutting is a process of cutting metal that uses a pressurized gas, in our shop we used compressed air, that spins around an electrode in the torch. That air is then squeezed through a small opening on the torch tip. When an arc is established between the charged electrode and the conductive workpiece the gas become ionized and becomes plasma. Plasma is the fourth state of matter, an example of plasma is lighting or electric sparks. This plasma blasts away the conductive material being cut. This process is a very quick and efficient way of cutting down material and leaves little slag to clean up on the workpiece (Figure 1 & 2).



Fig 1. Plasma cut numbers (1/2" stainless steel)



Fig 2. Image of slag on the back of the cut steel.

What is CNC Plasma Cutting?

CNC plasma cutting is the same process of plasma cutting described above. However, instead of hand operating the torch, the torch is mounted to a gantry with motors that move according to your file on the computer. The settings for cutting different materials and thicknesses are programs that run while the plasma cutter is cutting your file.

What type of metal can be Plasma Cut?

Any conductive metal can be cut using the plasma cutter. The amount of cleanup needed after a cut is made depends on the thickness and type of metal. Softer metal will require more cleanup than harder metals because of how they react to the heat. Thick metals (1/2") will have a large bevel and the edges will need more grinding (Figure 3 & 4).



Fig 3. Brass (1/2" thick) cut with plasma cutter.

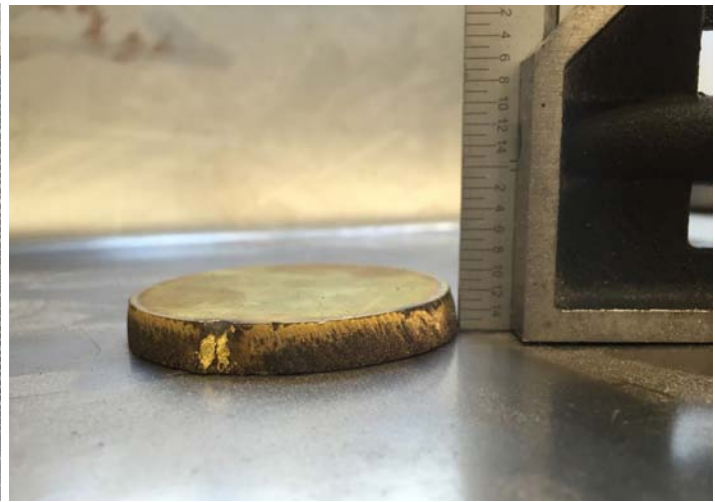


Fig 4. Bevel as a result of cutting 1/2" thick material.



Fig 5. Shows loss of detail in the cut as the object becomes smaller.

What is the thickness and dimensions of material that can be cut?

The bed of our plasma cutter is 48" x 48" (121.92 cm x 121.92 cm). Your material should at maximum be the size of the bed. Your material should not be so small that it could shift around when the plasma cutter is cutting. Your material at minimum should be 12" x 12" (30.48 cm x 30.48 cm). The plasma cutter can cut up to 1/2" thick piece of material.

What types of cuts can I make?

The CNC plasma cutter in the metal shop makes 2 dimensional cuts. It will cut flat sheet metal straight through leaving both a positive and negative piece of material. You can use this process to make a sign with text, a design on a sheet of metal, a custom bracket. See Figures 6-9 for examples of plasma cut pieces.

Due to the high heat generated by the torch that is transferred to the material the metal can warp significantly. If a file being cut has too many details it can cause the material to warp.

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For example, if the file has too many small holes that are close together or a pattern that mimics lace. The thicker your material the less likely it is to warp.

The plasma cutter is not capable of cutting with precision on a small scale (See Figure 5)

Please consult a technician to help decide if plasma cutting is the right process for your project.

Please note: The plasma cutter **will not etch** into metal and will only cut through flat material.



Fig 6. Sign with light cut with plasma cutter



Fig 7. Dimensional sculpture assembled using plasma cut components



Fig 8. Functional cabinet comprised of plasma cut sheets.

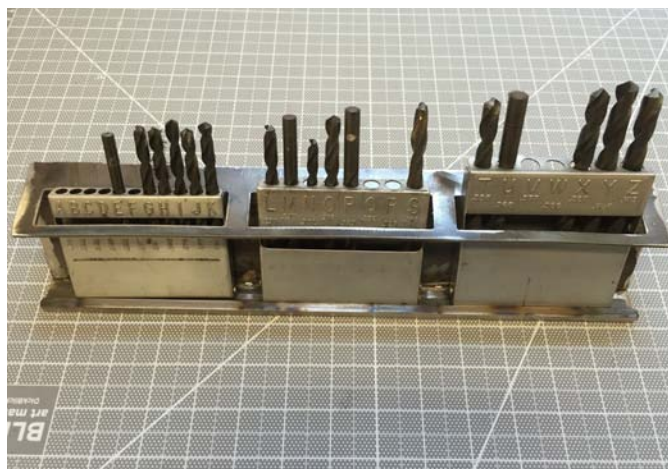


Fig 9. Drill bit holder made using plasma cut components

What happens during the consultation?

Before a file can be submitted in the cutting queue the student must meet with a metal shop technician during consultation hours.

Consultation hours will be held in the **E4 Metal Shop M-F (hours)**

During this consultation you will be able to discuss your project and whether plasma cutting is right for you. You will also be able to submit your file to the technician for review. The technician will check for errors in your file and give instructions on how to improve your file for the best cut

result. If your file is 100% ready to cut and you have your material ready, the technician will input your file into the queue.

How long will it take for my file to be cut?

Once your file is submitted in the queue it will take 3-4 business days to be cut. It is your responsibility to plan accordingly for your deadlines!

Can I make a change to my file after it is submitted?

Yes. Meet with a technician during consultation hours to submit the change. A technician will not accept this change unless it is during consultation hours. Any changes made to your file after submission will alter your position in the queue!

Where can I find the Queue?

The queue can be viewed at resources.parsons.edu under [CNC Plasma cutting queue](#). You can view the status of your file in the queue.

What do I do when my material is cut?

Once your material has been cut it should be collected as soon as possible. You are responsible for removing both your cut piece and any scrap material your cut produced.

Can I leave my unused material in the metal shop?

No. Material not currently in the queue cannot be stored in the metal shop for any amount of time or reason!

Do I have access to my PCM file for the future?

Yes, After your file is cut you will have access to the file that was used in the PlasmaCam software. The Metal Shop cannot store your file. It is your responsibility to store this file for any future cuts.

