

STOP

BEFORE WELDING, BE SURE YOU HAVE:

1. PROPER LEATHER OR COTTON CLOTHING
2. CORRECT MASK FOR WELDING
3. FUME HOOD TURNED ON

Gauss-Johnson Welding

1. Before you begin
 - a. Types of welding
 - i. Mig-plain carbon steel (pictures)
 - ii. Tig-stainless steel, aluminum (pictures)
 - iii. Brazing-other metals, dissimilar metals (pictures)
 - iv. Cutting-plasma, oxy-acetylene (pictures)
 - b. Orientation-Seek approval from mentor or shop manager
 - c. Attire
 - i. Shop rules (pictures)
 - ii. Protect skin-long sleeves (picture)
 - iii. Cotton, denim, and leather, not nylon or polyester
 - iv. Gloves (film)
 - v. Safety glasses (film)
 - vi. Helmet (film)
 - d. Location (film)
 - e. Available resources (film)
 - i. Posters
 - ii. Welding Skills Book
 - iii. Tables on welding machines
 - iv. Shop resource book
2. Mig (film)
 - a. Primary use plain carbon steel
 - b. Tools needed and where to find them
 - c. Set up using resources
 - i. Plain carbon steel 1/8 inch thick
 - ii. Plug in
 - iii. Set ground
 - iv. weld
3. Tig (film)

- a. Primary uses are aluminum and stainless
- b. Tools needed and where to find them
- c. Set up using resources
 - i. Aluminum 1/8 inch thick
 - ii. Proper electrode
 - iii. Plug in and set ground
 - iv. Foot pedal
- d. Taking out electrode
- e. Grinding electrode
- f. Rounding off electrode
4. Other forms of welding available (film)
 - a. Brazing
 - b. Cutting
 - c. Plasma cutter
5. Clean up after use and put everything away
6. Conclusion
 - a. Use resources
 - b. If don't know, ask
 - c. Proper attire
 - d. Types of welding available and when to use them

Narration

Introduction

In the Gauss-Johnson machine shop, there is a welding area which has tig, mig, plasma cutting, oxy-acetylene which can be used for both brazing and cutting. If you have a project that needs welding, this video should help get you familiar with the welding capabilities of the Gauss-Johnson machine shop.

Before you begin (outside shop door)

Before you begin, you need to know what this welding area can allow you to do. Since it only has basic equipment, mig welding can only be done on plain carbon steel. You can use tig for aluminum and stainless steel. If you are trying to weld a different metal or two dissimilar metals, brazing is probably your best option.

As in all machine shops, this shop promotes safety first. That means that you must go through the orientation before you can use the welding facilities. After accomplishing that, you should talk to the shop manager about your experience and then you will be allowed to use the welding area when needed. For each project, it is also recommended that you seek approval from a mentor or the shop manager.

The next step is to make sure you have on the proper attire. Before entering the shop, it is required that you wear long pants and close toed shoes. For welding, you also want to make sure you clothes aren't likely to catch fire or melt easily. Stick with cotton, denim, and leather clothes or others like it and stay away from nylon and polyester.

With the proper attire, you can go in the machine shop. Make sure to pick up some safety glasses that must be worn at all times while in the machine shop. They are located at each entrance. The welding area is located just to your right as you enter from the senior design suite.

Getting Started

By now you should know what type of welding you need to do. Once you know that, you need to look up what settings to put the machine on. It is always recommended to use whatever resources that are available to you and practice on scrap metal before trying to weld your part. In the shop, we have the following posters which give an overview of what you need to know for safety, tig welding, or mig welding. Other resources include the Welding Skills book located in the cabinet, tables on the mig welder itself, and the shop resource book located over by the Haas CNC mill.

Before you start welding, you need to make sure you have leather gloves and the proper helmet to shield your eyes. Remember that no bare skin should be showing when doing either tig or mig welding.

It is always best to clean what you are trying to weld. This can be done using the wire brush by the grinder. Make sure you aren't wearing gloves while using it. Other tools which you should get out in case you need them are the wire brush for cleaning after the

weld, the hammer for chipping off any slag, and the pliers for holding a hot piece of metal. These can be found in the cabinets.

Mig

Let's say you need to do 1/8th inch butt weld for plain carbon steel. If you have the metal prepared, and you know you are using mig, then the next step is to look up the settings on the poster. Now, you can start setting up the machine. To start with, plug in the machine in the location shown. Make sure to ground it as shown. Set the machine to its proper settings, then you can turn it on and get started.

Tig

In many cases, you aren't welding plain carbon steel so for aluminum or stainless steel, you want to use tig. The electrode for tig changes depending on what you are doing with it. In this clear plastic container kept on top of the tig welder, you have both electrodes in different sizes. Make sure you have the right electrode. To do that, check the poster and remember that green is for steel and red is for aluminum. As you can see on the poster, for aluminum you are using AC current and it has a rounded tip. In order to make the rounded tip, you need the copper block stored in the cabinet. To see how this is done, watch the videos specifically for tig welding. If you are welding steel, you need to grind it to a point. Often, as you weld, you can accidentally touch the filler rod, or the weld pool. When that happens, the electrode gobs up and you have to go grind it to a point. Do not use the grinder in the welding area, go to the other end of the shop where the other entrance is located and use the green grinder for carbide tools. When grinding make sure you aren't wearing gloves and hold the electrode vertical, not horizontal. Now to set up the machine, look at the poster for the settings and the proper filler rod. You plug in and ground the machine the same way you do mig. The only difference is the foot pedal which you should set within reach of your foot.

Other Welding

For brazing, use the oxy-acetylene welder. The goggles in the cabinet are used rather than the welding helmets because they are too dark to see the flame very well. The tip for brazing looks like this and other sizes are in the cabinet. You will also need a flux coated filler rod.

Also using oxy-acetylene, you can do cutting using the cutting torch. That can also be done using the plasma cutter.

Clean Up

Once you are finished welding, clean up and make sure everything is put away. If you aren't sure where something goes, ask.

Conclusion

For more information on these types of welding, you can watch the other welding videos on the mindworks website, consult the Welding Skills book in the cabinet, or use the shop resource book.