

Steel Jack-O'-Lantern Kit Tutorial

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Level of Difficulty: 1/5



[Watch the Video Tutorial Here](#)

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Introduction

This kit is a great introduction to the basic equipment in OriginLabs' Welding Lab! You will get hands-on experience doing some simple tack welds with the **MIG welder**, and you'll get to carve out your own jack-o'-lantern designs using the **plasma cutter**. The pieces of the lantern frame are cut out on our metal laser and included in the kit. This project is very forgiving when it comes to mistakes and is a great custom decoration for Halloween!

Required Trainings

Trainings are required to use certain equipment at OriginLabs. These trainings do not expire. Please complete the following trainings before picking up your kit:

- MIG Welder
- Plasma Cutter
- Sandblaster (optional finishing method)

What's in the Kit?

The following are the items that should be inside your kit. If anything is missing, please inform an OriginLabs staff member.

- 18g steel cutouts
 - 2 front/back plates
 - 2 side plates
 - 1 bottom plate
- Orange ribbon



Figure 1: All of the kit components laid out

Materials to Purchase

If you do not wish to purchase the kit at OriginLabs, the following are the materials you should purchase/acquire:

- 24"x24" 18g steel
- Ribbon/something to create a handle (optional)
- Download "blank lantern template for 18g steel" (linked in the SharePoint)

If you did purchase the kit at OriginLabs, below are some optional materials you can purchase to customize your project:

- Spray paint for metal
- Metal spray enamel (for rust prevention)
- Rubber bumpers (for the bottom of the lantern)
- Fake candles/light source

Safety Overview

Make sure you wear all appropriate shop safety attire. This includes hair tied back, no dangling jewelry/accessories, long pants, and closed toe shoes.

While using the **MIG Welder**, please put on a welding jacket, gloves, and helmet. Make sure your welding helmet is **not** set to grind mode.

While using the **plasma cutter**, please put on a welding jacket, gloves, and helmet. Set your welding helmet to grind mode.

Metal will be hot to the touch for around 5 minutes after welding and plasma cutting. Please allow your metal to cool before taking it out of the Welding Lab.

All hot work at OriginLabs must be completed 30 minutes before close.

Welding the Frame

1. Set up the MIG welder
2. Get all your welding safety gear on
3. Snap together all the steel cutouts so that it looks like **Figure 2**.
4. Lay the lantern flat on one of the front/back sides
5. Now, it's time to do tack welds. You will place them on the inside of the lantern at every internal corner (8 total)

6. Tack Welding

- a. Tack welding is just a very quick, small, beginner friendly weld that quickly attaches pieces of metal together
- b. To do a tack weld, place your torch where you want to place your weld, start your torch, and do 3 quick, small circles that touch all the pieces you want to connect. It should leave a small, round weld (*see the video tutorial for a demo*)

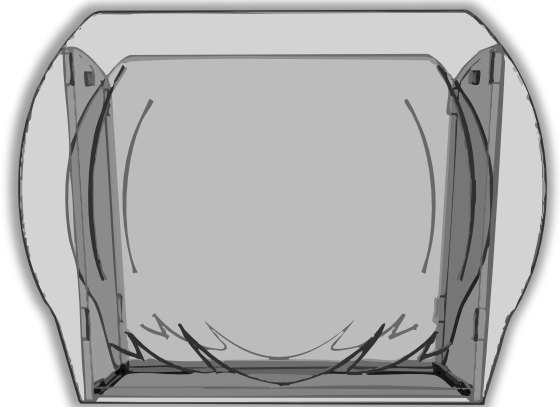


Figure 2: X-ray view of the steel cutouts assembled.

c. On the jack-o'-lantern, start with the 4 internal corners that are connecting the plate that is flat on the table to the two side pieces

d. Pick your first corner and place your torch right up into the corner's crease without actually touching it (see *Figure*

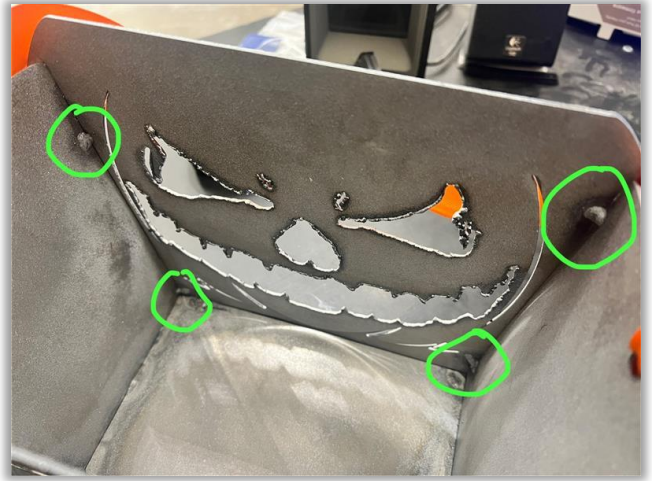


Figure 3: The location of the tack welds on one side of the lantern

3 for the locations of the tack welds)

e. Once you are ready, turn your torch on and make a small circular motion, making sure your circle is touching all the cutouts in this corner, for no more than 2 seconds

f. Assess your weld to make sure it is in fact connecting the intended steel plates

g. Repeat for the other 3 internal corners on this side

h. Once you have completed your 4 tack welds, flip your lantern so that the other front/back side is now lying flat on the table.

i. Now repeat this process for these next 4 internal corners

7. Test your lantern to see if any parts are loose and redo any welds as needed

8. Your lantern should now be ready for carving! Please allow 5 minutes for your lantern to cool before moving onto the next step

Drawing Your Design

1. You can either freehand, use a premade stencil, or print out your own custom stencil to draw your jack-o'-lantern face
 - a. If you wish to use one of the premade stencils, ask staff at OriginLabs to get it out of storage for you
 - b. If you wish to make your own custom stencil, you can laser cut it using our scrap material or just print out a piece of paper and cut the design out of it
2. Grab some soap stone, which is a white, rectangular bar you can find next to the metal drill press. Soap stone is a great way to mark metal as it isn't permanent
3. Using the soap stone, trace/freehand your design onto your lantern
4. If you want to cut out both sides of your lantern, flip the lantern over and draw your second face on the other side



Figure 4: Students tracing and free handing their jack-o'-lantern designs using soap stone.

Plasma Cutting the Lantern

1. Set up the plasma cutter

2. Lay your lantern so that the face you drew is facing the ceiling
3. Cut out the design you drew
 - a. The plasma cutter will only cut the side it is in contact with, so the back side of the lantern is safe
4. If you want to cut out the other side, flip your lantern over and cut out your second design
5. Now your lantern is ready for finishing!
Please allow 5 minutes for your lantern to cool before moving onto the next step



Figure 5: A student plasma cutting their pumpkin lantern

Finishing Options

Listed below are some optional ways you can make your lantern more personalized. Feel free to mix and match the following options:

- Adding your ribbon/handle
 - Use the provided ribbon, or source your own type of handle to make your lantern easy to carry
- Paint your lantern in one or multiple colors with spray paint for metal
- Seal your lantern from the elements/rust by purchasing a spray-based metal enamel
 - HIGHLY recommended if you want to prevent rust

- Sandblast your lantern to give it a sparkly finish
 - You should use the Black Beauty sand at OriginLabs
- Purchase LED candles to place inside the lantern
- Add rubber stoppers/bumpers to the bottom to prevent it from scratching surfaces it is placed on

Share Your Experience!

Congratulations on finishing one of OriginLabs' kits! Hopefully you had fun and learned something new along the way!

We would really appreciate it if you could take 5 minutes of your time to fill out the following **survey** on your experience:

<https://forms.office.com/r/r97HNGDcgR>

We would love to hear your feedback so that we can make these kits as accessible, fun, and educational as possible!

If you plan to post your build onto **Instagram**, please tag us at @originlabs_build

If you have any **questions or concerns** about the kit or about OriginLabs in general, please reach out to originlabs@psu.edu and we'll get back to you as soon as we can.