# WAZER Desktop Waterjet Cutter Safe Operating Procedures

Last Updated: 7/20/23 Rachel
This SOP is compiled from the following sources. For more information reference these sources.

- Wazer User Manual
- Wazer Maintenance Manual

## Training Checklist

- Safety Considerations
- Materials
    - Allowed Materials
    - Prohibited Materials
- Mounting Materials in the Bed: Polypropylene Plastic Corrugated Bed
- Cutting
- Troubleshooting
- General Material Recipes For Aluminum
    - Thickness, cutting settings
- Ask wizard for assistance creating new material recipes

## Location

The Wazer Waterjet is located on the second floor in the Innovation Workshop, found across from the lathe.

## Overview

- This training provides an introduction to using and operating the waterjet cutters including:
    - File Types
        - DXF
        - SVG
    - Software
        - Job Control
        - WAM Software
    - Safety
        - General hazard
        - Material composition
    - Waterjet Use

## Safety Considerations

- Always wear safety glasses when using the machine.
- Always work with the machine cover closed.
- NEVER leave the waterjet alone when running a job.
- The machine door must be left open while you are away.

- Remove leftovers of used abrasive in the used abrasive bucket before running a new job.
- Confirm that there are no leaks when running a job.

# Material

Always check materials list BEFORE attempting to cut/engrave a material. If unsure contact IW Staff.

## Allowed Materials

- Thin sheets of metal
- Glass and ceramics (will produce larger kerfs)
- Plastic (poor finish and will clog filters)
- Rubber (poor finish and will clog filters)
- Composites (will delaminate)

## Cutting with the Wazer Waterjet

1. **Check water bed level**. Make sure the water level is nearly up to the top of the bed (within 2 mm or so). If there is not enough water, add some more with the rubber hose connected to the DI water. Insufficient water levels will not allow the waterjet to turn on.
2. **Check Abrasives**. Make sure the unused abrasives are filled to the bottom of the sieve, and make sure the used abrasives bucket is emptied.
3. **Open WAM**. This is where you will create the toolpath for your job. Upload your DXF or SVG file onto the software, and export it via SD card.
    1. Scale and position your material. Importing the file may result in a change in dimensions, so double check the measurements are still the same.
    2. The waterjet has the origin set to the top left corner of the machine. The top-left corner of the toolpath inserted will become the new origin and where the nozzle will move to after the homing sequence.
    3. Select the material you are working with and select the corresponding thickness. If you do not see the material you are cutting, contact a wizard.
    4. Select the cutting path offset. This will allow you to control how the kerf will affect your cut.
    5. Select your tabs and leads. This will prevent vibration/pop-ups, which will jam the waterjet and ruin the cut, and also improve accuracy.
    6. Select the cut quality. This will determine time for each job and the amount of abrasive used.
4. **Turn on Water and Power Supplies**. Turn on the water by turning the sink on. If there are any signs of leaks, turn off the water immediately and notify a wizard. Make sure the power supplies have a green light on. If not, try pressing reset.
5. **Insert SD Card, Turn On, and Select Cut File**. Make sure you insert the SD card before turning on the waterjet! The power switch is located on the underside of the right, towards the front. Select your cut file.
6. **Lift the Nozzle and Home**. This will prevent the nozzle from crashing into anything when homing. Click "OK" to start the homing process. The nozzle will move to the top-left corner of your material's toolpath.
7. **Place material on bed**. Fixture your material with fasteners. For brittle materials, do not over-torque the fixture. Make sure your fixtures are not in the way of the toolpath.
    1. Line up the top left corner of the material with the center of the nozzle.

8. **Set Nozzle Height**. Jog the nozzle over the material. This will not affect the starting position for the cut. Place the Nozzle Height Tool underneath the nozzle, and gently lower the nozzle onto its flange. Tighten the knob and replace the Nozzle Height Tool at the top of the nozzle. Press "OK".
9. **Perform a Final Check**. Click Check Cut Extents or Dry Run in order to check where the toolpath will run into without actually cutting anything.
10. If everything is OK, click the play button and your part will begin to print.
11. **YOU MUST NOT LEAVE WHILE PART IS BEING CUT**
12. Once the print has been completed, open the lid, lower the bed and remove the part. Beware of sharp edges. Make sure all pieces of material are removed from bed.
13. **Tank Cleaning and Maintenance**. Run a tank cleaning cycle if you are not making another cut for a while or if the machine has been running for more than 4 hours. This will collect abrasive that is at the bottom of the tank. There will be some abrasive that accumulates from the door windows and on the bellows. If they are not coming off easily, let them dry and then sweep.
14. **Turn off the printer** and leave the lid open.

## Troubleshooting

- **Abrasive Clog**. If there are no cuts appearing after starting a job, it may be because the abrasive is clogged. Make sure there is abrasive coming out by removing the abrasive slip cover and then the dry abrasive hopper. Check to see if the plug hole has anything clogging it with a flashlight, and if there is, press the pinch valve button and clear it with compressed air. Press the pinch valve button again and if there is abrasive flowing through, the clog has been resolved.
- **Continuous High-Pitched Noise**. The waterjet will produce a loud high-pitched noise when piercing at the beginning of each cut. If the noise does not decrease after the nozzle begins moving around, it is possible that the material was not fully pierced. Pause the operation and check, and restart if needed.

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