



Plastic Cutting Guide

1. I recommend that you always wear Nitrile anti-static gloves while working with plastic. This reduces the likelihood of creating or distributing static charges while working. It also keeps your final product free of fingerprints.
2. Turn your chip vacuum all the way up. You need more suction cutting plastic than you do cutting lacquer. I have a variac on my vacuum to control the speed.
3. Insure absolutely no debris is in the vacuum tube. On a Neumann, there is a very small tube on the underside of the cutterhead that is curved. If any debris gets stuck in there it causes a pileup which results in dropped chip. Occasionally I run a pipe cleaner dipped in acetone through mine.
4. Blow compressed Nitrogen through the tube. This acts to reduce surface static on the tube itself. I've had chip pileups in the tube after I just cleaned it. The only thing that can account for this is static charge that I created as a result of cleaning. A couple shots of N solves this issue.
5. Slowly peel the protective skin off the first side while holding the disc over your air purifier with built in ionizer. The air should be rushing over the surface of the disc while you peel the protective layer away. In the past, I'm sure you've noticed how much static removing the layer creates. The hair on my arm would stand up without using an ionizer. When removing the skin over an ionized breeze you get ZERO static created. That is half your problems solved right there!

Using a negative ion generator is really the only way to insure no dropped chip due to static cling from the disc itself. Static on the surface would literally cause the chip to not get sucked up if it is intense enough. Also, it keeps every speck of dust in the air and in your room from coating the blank. I used to really hate that. Now, it is a non-issue.

I use the Honeywell Pet CleanAir Air Purifier. Model # HHT-013-HD

Run on low setting with ionizer on. Hold disc over the stream of air that emanates from the top of the unit.



6. Use a lamp for heating the blank before and during cutting. I use a red bulb from a bathroom sauna fixture sold at the local hardware store. Do be very careful, the bulb gets very hot! Use at your own risk. I take no liability for your use of a heating fixture of any kind. Also, be mindful not to warp your blank by overheating it!

7. I use a heat gun to tell when the disc is at optimal temp. In excess of 90 degrees is good. Around 100 or more and you risk warping or dishing the disc. Clear discs need the heat lamp very close to the surface to get to temperature. Black discs do not need the heat lamp so close to achieve temperature. Be careful of this. You don't want your blanks to warp. Same goes with 12" vs. 10". 10" discs need less heat, so back off on the heat bulb a bit.

8. Spray turtle polish twice onto a clean microfiber rag and apply evenly to the side. Let it dry. Has a nice coconut smell. Mmmmmm. I use the Wax & Dry product from Turtle Wax.



9. You need to insure the disc will remain locked onto the platter. There are many ways to affect this. Neumann and Scully users will already have a vacuum system that keeps the disc stuck to the platter. Other lathe users will need to figure out their own system. This could be as simple as a spindle clamp. Or, even pieces of masking tape around the edge of the plastic blank disc. However you implement this, you disc should now spin with the platter without slipping with modest downward force on the disc.

10. Get the disc up to temperature while it is spinning on the platter. You can't heat the disc stationary!

11. Run a little baby powder through your vacuum tube once in a while. This helps to reduce drag on the plastic chip as it travels through the tube. Any friction with the surface of plastic creates static charge. I've had chip pile up due to static buildup as it passed through the tubing. A ball of chip would then form in the tubing right at the top of the chip jar. Baby powder or talc will resolve this issue.

12. Adjust your stylus heat. This varies a bit by system. Slightly less than what you would use for cutting lacquers is good. Too much heat will melt plastic chip to your stylus. Then, you will have issues! I usually use about 0.4 Amps at 12 Volts.

13. Cut your side and repeat the process for the flip side. If you left the protective cover on the second side, don't forget to account for the difference in height after removing. You might have to go a hair deeper this time.

14. Never adjust the height of your suspension or cutting angle while cutting with the diamond. If you need to adjust the height to get a different depth of cut then stop cutting, make the adjustment, do test cut, inspect the cut with a scope and repeat the process until the desired depth is achieved. If you adjust depth while cutting you run the risk of breaking off the tip of the diamond or degrading edges.

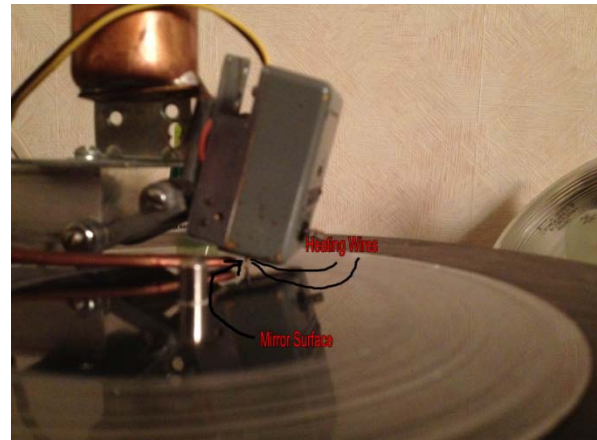
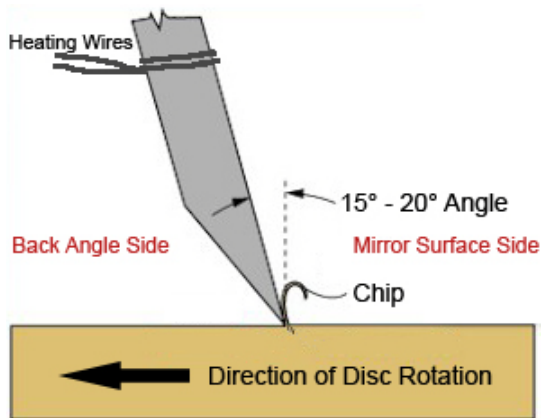
15. Always pay attention while cutting. If you see something going wrong, ABORT! Release the cutterhead immediately. Things that would cause me to abort include: head oscillations, dropped chip, chip buildup under the tip, chip buildup that is melting.

16. Have a beer, you've earned it!



Recommendations

1. Following the steps previously outlined will reduce or eliminate the creation of static. Static is an issue with respect to chip removal. If you get static buildup, then the chip will start to ball up under the cutterhead. If the ball of chip gets forced under the tip of the stylus by the rotating disc, your cutterhead will jump up off the disc and slam back down again. If this happens enough, you can chip the tip of the diamond off. Any further cut with a chipped diamond will sound horrible. Please protect your cutterhead and diamond stylus by not allowing static to build up and chip to ball up. If you are using heat and chip starts to ball up you risk it melting and fusing to the tip of the stylus. This will also degrade the tip and cause background noise in subsequent cuts.
2. Be very gentle as you lower your cutterhead to the disc! If you lower it too quickly and too hard, it will damage the diamond tip. Please, for your own satisfaction, be as gentle as possible when initially applying your stylus to disc.
3. Apply only enough pressure to cut a 2 to 3 mil groove.
4. Cut at a 15 to 20 degree angle. Please see picture below. Neumann users already have their cutting angle set to 18 degrees by default. Your exact cutting angle depends on your cutterhead and suspension. We recommend using 15 degrees as a baseline and 20 as your maximum. Somewhere in between you will get the best sounding cuts and lowest noise.



5. Go easy on the heat. Only use as much as you need to get a good cut groove with minimal background noise.
6. Never handle your diamond by the stone itself. Never touch the stone with your finger tips. Always handle the stylus by the heater wires. If using a 320 style Neumann diamond, never touch the tapered metal shank. You don't want to introduce debris into your torque tube. If using a Presto long shank, then you may touch the metal shank as much as you like.
7. You can use a small amount of Acetone on a Q-Tip to clean your stylus. Though I don't recommend doing this very often. Unlike sapphire, too much cleaning will start to produce noise in your cuts.
8. The stylus has an orientation to it. Neumann users are already familiar with how to insert and orient the diamond correctly. Other users might not be as aware. Please observe in the diagram above that the completely flat side (mirror surface) of the stylus faces into the oncoming disc. The flat side is the actual cutting side from which the chip originates.
9. Use of a dashpot is highly recommended. This will provide damping of upward motion. Without a dashpot you risk damage to your diamond stylus and will certainly shorten its useable lifespan.

* I have zero issues with static or dropped chip following these guidelines.

** When I say static, I am referring to static charge. Not background noise. Though these steps will significantly reduce background noise. The only way to really solve that issue is to have the right stylus, heating wire and heat on the blank.

*** In my experience the biggest factor in reducing hiss is having a good cutting stylus. Mine are made to please. Mine are also made to live longer due to the process employed in their manufacture.

**** I'm producing a video that details the entire plastic cutting process. Look for this video in 2014!