

Static Reduction in CNC Dust Collection Systems

Dust collection systems are one of the primary generators of static in woodshops. This static becomes very problematic when the dust collection system is connected to a CNC cutting tool. For those ShopBot owners that have experienced issues caused by static discharge, getting a reasonably priced solution is often difficult to come by. The following should give those users a viable option.

Static is generated by air and dust movement in a non conductive hose. I have used metal ducting to solve a number of static related CNC control issues. The following pictures and instructions show the use of light gauge home improvement store type galvanized 4" ducting in place of the often used flexible plastic dust hose. The advantages of metal ducting are as follows:

- Metal ducting is installed grounded and "drains" any static charge carried inside by the particles
- Increases flow due to less restriction than flexible hoses
- Gives a reliable ground path out to the flex hose at the machine and allows it to be grounded well
- Properly installed, forms an anchor point for the flex hose to attach to

When you install a metal duct system to a CNC machine you should:

- Use as large diameter pipe as can be connected to the dust collector housing, reducing diameter as distance increases. In this case a small Delta collector was used that had a 4" connection
- Run the metal duct as far as possible, i.e., run it out to over the CNC table in the center 8 to 10' high
- Screw the fittings to the collector housing and to each other
- Tape the joints to reduce leakage
- Verify that the dust collector itself is actually grounded to the electrical system ground
- Make sure that the metal duct is grounded by adding a ground wire to the electrical system or collector housing
- Use a 4" flexible dust hose with an embedded wire. **DO NOT USE AN ALL PLASTIC HOSE**
- Use the shortest length of flexible hose that allows full movement to table extremities
- Make sure that the embedded wire from the flex hose is attached to the metal duct with a screw and crimp connector. In high altitude, low humidity, or problematic locations an additional stranded wire run thru the hose may be required. This must also be connected to the ground screw with the embedded wire from the flex hose
- If using an OEM ShopBot dustfoot, connect the included alligator clip to the embedded wire at its machine end termination
- If you use an insulated attachment point to the CNC gantry, make sure ground is continuous around it. In some high static environments this insulated attachment is necessary

The following pics and details may help explain the above:



Metal Duct is screwed to collector housing with self tapping screws made for ductwork



Missing ground lug on dust collector plug (requires adding additional ground wire)



Joints Screwed and taped



Ground wire added to metal duct



Connection screwed before taping



Flex hose clamped to duct and ground wire attached





Use and connection of an insulated connection point to the gantry bracket. A piece of 4" OD plastic tube is clamped to the gantry bracket, hoses are clamped to that. Note that the embedded wires have been stripped back and connected with a crimp connector



Overall view of metal ducting and collector prior to installing tape

