

so that there is a smooth transition at the joint. This smooth transition will help prevent debris from getting trapped, thus clogging the system. In addition, this braided wire should be spiral-wrapped around the exterior and grounded as well.

Both metal and plastic piping require final connection to the machines. This connection should be made with flexible hose, not rigid piping.

The use of flex hose will allow movement of the machine without damaging the ducting system. Metal piping typically connects easily to flex hose whereas plastic usually does not always mate correctly. A common method for this connection is to wrap duct tape around the plastic fitting increasing the diameter, or fabricate a wooden donut



Example of metal ducting specifically designed for dust collection.

so that the connection can mate correctly. When using the flexible hose, try to minimize the lengths, because its deeply corrugated surface can increase static pressure loss by as much as 50% over smooth-walled piping.

### Location of Dust Collector

The location of the dust collector is very important because it will affect the overall efficiency and cost of the system. When deciding the location of the dust collector, do not consider installing it in a room that has any ignition source. In addition, keep in mind that if installing outside the shop area in a small room, the air removed from the shop must be exhausted so that there won't be a pressure differential causing the dust collector efficiency to drop.

## Coolant

Using a CNC coolant system is an excellent method to improve cut quality and to extend the life of your tooling. In some applications it is not just a good idea, it is an absolute necessity. In many cutting applications, particularly plastics, the remelting of the cut particles is often the source of cut quality problems. Removing these cut particles with an air source sometimes solves the problem. In other cases, both cooling and air supply are required to remove cut particles. Considering how expensive CNC tooling can be for some

applications, extending the life of your bits also puts money back in your pocket.

Three standard CNC Router coolant systems that you are likely to consider are: Micro-Drop Coolant Systems, Mist Coolant Systems and Cold Air Guns. All three systems cool the tool, not the workpiece. The Micro-Drop and Mist systems are used primarily on metal cutting applications, whereas plastics, woods and some metals can be cut with the Cold Air Gun.



The highest initial purchase price of the three is the micro-drop system. The main benefit of a micro-drop system is that it is a much cleaner system than misting. The unit's micro-dispenser applies very small amounts of coolant to the tool. This is beneficial in that it does not waste product, it is a cleaner cooling method, but also, because of these aspects it can be used with a vacuum table (a Techno setup). Coolant, in general, can damage the material typically used on vacuum tables.

Misting coolants are less expensive than micro-drops and are equally successful in cooling the tool. They have a large reservoir capacity to maintain the constant flow of coolant. As opposed to the micro-drops intermittent application of coolant, the mister applies a steady stream. The nature of this system does not lend itself to clean operations, and therefore are not recommended in conjunction with a vacuum table.

The Vortex cold air gun can work with or without a vacuum system setup and is ideal for plastics and woods. Its steady stream of cold air prevents melting and chips igniting. The vortex tube's cylindrical generator causes compressed air to rotate, reaching speeds of up to 1,000,000 rpm, as it is forced down a longer inner wall of the tube, to produce the super-cooled air that exits through an air exhaust port.