



# Low powered air plasma for ductwork

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The first plasma systems used on early HVAC duct machines were adapted from a couple of plasma manufacturers' larger, heavy industrial plasma cutting products. These machines were typically used for handheld cutting applications or with a machine torch on robotic and CNC machines.

Since the duct cutting machines spent 99 percent of their productive time cutting 24 or 26 gauge galvanized steel, and most of the other plasma cutting applications in the world at the time were in the 1/4 inch to 6 inch thickness ranges on mild steel, aluminum, and stainless steel, plasma manufacturers like Hypertherm had to carefully look at the HVAC market to determine if a specially built lower-amp plasma system designed specifically for thin materials was feasible. Ultimately, a 40-amp air plasma system was developed that could cut 26 gauge galvanized at speeds

of around 350 inches per minute, using 3 phase power and standard shop compressed air to produce a high-speed plasma jet.

Smaller air plasma systems are the most common type of plasma on duct systems today. These units, which weight less than 50 pounds, operate very efficiently on single phase AC power and compressed air.

The power supplies used for these 1980-era systems were of a similar design to welders, that is to say they were bulky, heavy, inefficient, and far less reliable compared to the technology available today. Another challenge with these early systems was consumable life. It wasn't that good. Typically, the nozzle and electrode in these early systems would cut 100 or so duct fittings before they were worn to the point of replacement. Practically, this meant an



operator would get through three to six sheets of galvanized steel before having to replace the consumable parts. Still, these systems had one important benefit: they dramatically increased productivity and profitability.

Fast forward to today's plasma cutters. The latest technology used on HVAC sheet metal cutting machines provides a portable inverter based technology power supply. The Hypertherm Powermax45®, probably the most common plasma cutter used on duct cutting systems today, weighs in the range of 30 pounds, and operates efficiently on single phase AC power and compressed air.

Its torch design uses shielded technology and advanced conical air flow design that allows for cut speeds in the 450 inches per minute range, and, most importantly, provides for more than 10 times the consumable life of early models. These systems are plug and play compatible as replacements for the older technology plasmas currently in use, yet are faster, cost less to operate, and are far more reliable under even the highest duty cycle applications.

While the earliest plasma cutters were designed with only thin gauge materials in mind, the inverter based air plasma systems available today have a much wider

cutting thickness range. The 45-amp air plasma previously mentioned can cut up through 1/2 inch steel on a production basis. There are also lighter and smaller options for field use, including systems with built-in air compressors. Systems like this can run on a standard 20-amp, 120-volt power outlet or even on a generator. They really are the fastest way to cut galvanized steel in the field using a handheld torch placed right on the metal surface being cut. This allows technicians to drag the torch along the edge of a straight edge or template for very accurate cutting of additional duct or branch holes that are so often necessary.

Along with the additional capabilities, ease of use, and higher productivity levels of the CNC duct cutting machines on the market today, keep in mind that plasma cutting technology has advanced as well. There are opportunities to upgrade just the plasma system on your existing CNC machine, or to add this technology for the field installation crews to improve their productivity and versatility. Happy cutting!



Plasma systems are useful both in the fabrication and installation of ductwork.

Learn more at [Hypertherm.com](http://Hypertherm.com)

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