Fundamentals of GUNDRILLING on CNC.

All the benefits of gundrilling on a dedicated gundrilling machine can also be achieved when utilizing non gundrilling equipment, specifically, vertical and horizontal milling and turning machines of all kinds. Usually the only restrictions are whether the machine in question can handle the length of the drill and has sufficient coolant pressure. Again, gundrilling typically yields sizes within +/- .0005, TIR to within .001 per inch (half as much if counter rotation is used), straightness of .001 per foot, and surface finishes equal or better to reaming, all possible in a single pass.

When considering gundrilling on CNC equipment there are some fundamental processes that make this operation predictable and repeatable.

Prepare pilot hole – Standard gundrill machine bushings are +.0002 over the drill diameter. When preparing the pilot hole the goal must be to duplicate that gundrill bushing tolerance. For practical purposes, a pilot hole that is +.0002 - +.0005 over the drill diameter, 2 diameters deep, will produce the desired results. However, the closer to the +.0002, the better.

Set coolant pressure based on diameter recommendations. Note: if a drill calls for 1500 PSI (.1250") and a machine only has 1000 PSI, there is still a good chance to be successful. Always check with a DME application specialist for assistance. (See chart below)

Check unsupported tool length chart to assure no 'whipping'. (see pdf)

Set feed and speed. (see pdf)

Enter pilot hole dead spindle.

Coolant on, speed on, feed on.

On pass to the finish, uninterrupted, no pecking.

Coolant ratio 10-12%

Dia.	PSI
.0550	1800
.0780	1650
.1250	1500
.1875	1150
.2500	925
.3750	675
.5000	525
.7500	400

Formulas

$$RPM = \frac{3.82 \times SFM}{DIAMETER}$$

$$SFM = \frac{RPM \times DIAMETER}{3.82}$$

$$IPM = FPR \times RPM$$

$$FPR = IPM / RPM$$