

## Genmitsu CNC Router Bits Tool Database

These milling bit data sheets will be used as reference data for end mills for your CNC project, the actual parameters should be adjusted according to your project and material.

The bit data file can only be used with the specified Genmitsu item number. Using this file with other brands is dangerous for the operator and the CNC machine.

### Fusion 360™ CNC Tool File

Fusion360 has multiple speed and feed options for each toolhead, so the tool database that can be imported into Fusion360 is organized accordingly. It has a common tool database format, which means creating a file for the entire tool database that can be imported.

[Download the file](#)



### Carveco® CNC Tool File



Carveco has a single set of speeds and feeds per bit definition, the tool database allows groups and sub-groups within it so for different speeds and feeds the same tool must be defined separately for a different machine, material and operation.

There are two tool database files:

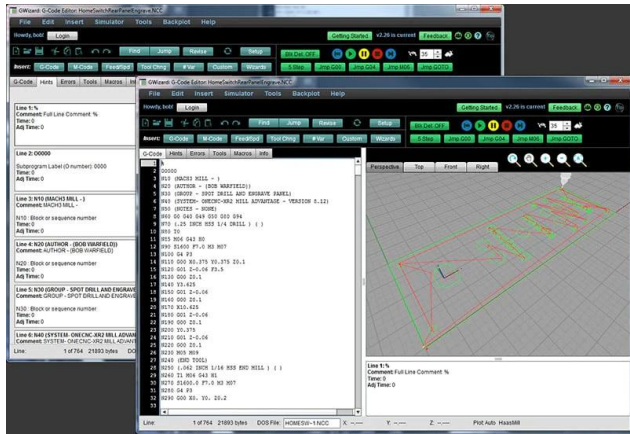
- 'SainSmart Bits (Carveco\_Metric).tdb'
- 'SainSmart Bits (Carveco\_Inches).tdb'

Apart from the units used for definitions and feed rates these are identical.

Import either (or both) into the Carveco Tool database. The bits you have can then be copied, moved... as you see fit to suit your needs and organisation of the tool database.

[Download the file](#)

## G-Wizard CNC Tool File



G-Wizard is a speed and feed calculator designed primarily for larger and more expensive CNC routers, but it can also be used for smaller routers. If you use G-Wizard, there is a single file that can be imported into G-Wizard that does not include the speed and feed, because that is what G-Wizard generates and G-Wizard performs the inch conversion internally.

[Download the file](#)

## Other Software CNC Tool File

To cover any other options two tables are included these contain all the parameters for the bits and speeds and feeds.

[Download the file](#)



## Some Simple Formulae

Here are the formulae used for some feed and speed calculations, not really necessary but if someone starts talking about Surface speed or MRR this explains the calculations.



## Values

Bit Diameter	The diameter of the cutting edge of the bit
Spindle Speed	Rotation speed of the bit in RPM
Flutes	The number of cutting edges on the bit
Feed Rate	The rate the bit is moved into the stock in a straight line
V Bit Angle	For V bits only the angle between the edges of the V it will leave. Only used in the V and ball depth and width calculators.
Depth of Cut	How deep the finished cut will be. Only used in the V and ball depth and width calculators.
Cut Width	How wide the top of a finished cut will be. Only used in the V and ball depth and width calculators.
Stepover	The distance the bit moves horizontally between cuts.
Stepdown	The distance the bit moves vertically between cuts.

## Formulae

Measurement units can be inches or mm, feeds in inches/min or mm/min but they cannot be mixed, the results will be in the units used.

Bit Circumference	$\text{Bit Diameter} * \pi$
Surface Speed	$\text{Bit Circumference} * \text{Spindle Speed}$
Cutting Speed	$\text{Surface Speed} * \text{Flutes}$
Chip Load	$\text{Feed Rate} / (\text{Spindle Speed} * \text{Flutes})$
Feed per Cut	$\text{Feed Rate} / \text{Flutes}$
V Width	$\tan(\text{V Bit Angle}/2) * 2 * \text{Depth of V} + \text{Tip Diameter}$
V Depth	$(\text{V Width} - \text{Tip Diameter}) / (\tan(\text{V Bit Angle}/2) * 2)$
Material Removal Rate (MRR)	$\text{Feed Rate} * \text{Stepover} * \text{Stepdown}$

As you can see all these calculations can rapidly become circular, they are all using the same few basic parameters and are often only slightly different ways of expressing basically the same thing.