

# CCToolLibraryConvert

Version 2.0.1.0

The program is a TEXT editor for tool libraries from Carbide Create (CSV format) and Fusion 360 (JSON format).

- The program will limit input for correct format (string or number).
- Parameters have some obvious range limits (no negative RPM).

The program allows for unlimited concurrent files opened until you run out of resources (or the program pukes for some reason).

The programs intent was to provide an interface to manage the CC CSV tool libraries. I hate Excel.

The ability to read Fusion 360 based allows for import of many Vendor tool libraries.

The ability to write Fusion 360 libraries is functional, but limited in content awareness.

You should use Fusion 360 to manage Fusion files.

## File format differences.

Important concepts that maybe contained in library formats

- Identification – A unique ID and general information
  - CC Tool unique ID is the Number
  - F360 Tool unique ID is a GUID
- Tool Geometry – Dimensional information describing the Tool profile, Cutters and Material
- Cutting Data – Speeds, Feeds, Stock material
- Post – Options for machine
- Holder definition

### Carbide 3D – CSV format

- CC tool definition uses a single flat record that contains Identification, Cutter Geometry and Cutting Data.
  - a. The “header” defines the name and position of the parameter
  - b. Multiple parameters are no longer used in CC and are categorized as Legacy
    - i. Some of the Legacy parameters are used for the export process to the Fusion 360 format.
- Multiple records form a library.

Program capability

- You are allowed to Edit any parameter in the CC CSV record
- You are allowed to Add/Copy/Paste/Delete/Export any record.

### Fusion 360- JSON format

Fusion uses a tree structure.

- Where a “F360Library” container holds multiple “Datum”s. A Datum is a Tool Geometry definition.
- A Datum contains a “StartValues” container to hold “Preset”s. A Preset is a Cutting parameters definition.
- Fusion also has the concept of “Expressions” which allow scripting between variables.

Program capability

- You are allowed to Edit any parameter in the F360 JSON file.
- The program does NOT evaluate an Expression strings.
- No calculations between variables
- You are allowed to Add/Copy/Paste/Delete/Export only Datum and Preset objects.

## The effects of Reverse engineering the F360 Json file.

I was fortunate to find a C# library on GitHub which I derived for this program.

```
The Fusion 360 reader (class _360LibraryConverter) is derived from
// Author: David Johnson ©2020 DIY.Engineering LLC
// Date: 08/08/2020
https://github.com/dgjohnson/F360LibraryConverter
```

### Reasons the program missed parameters or bad value.

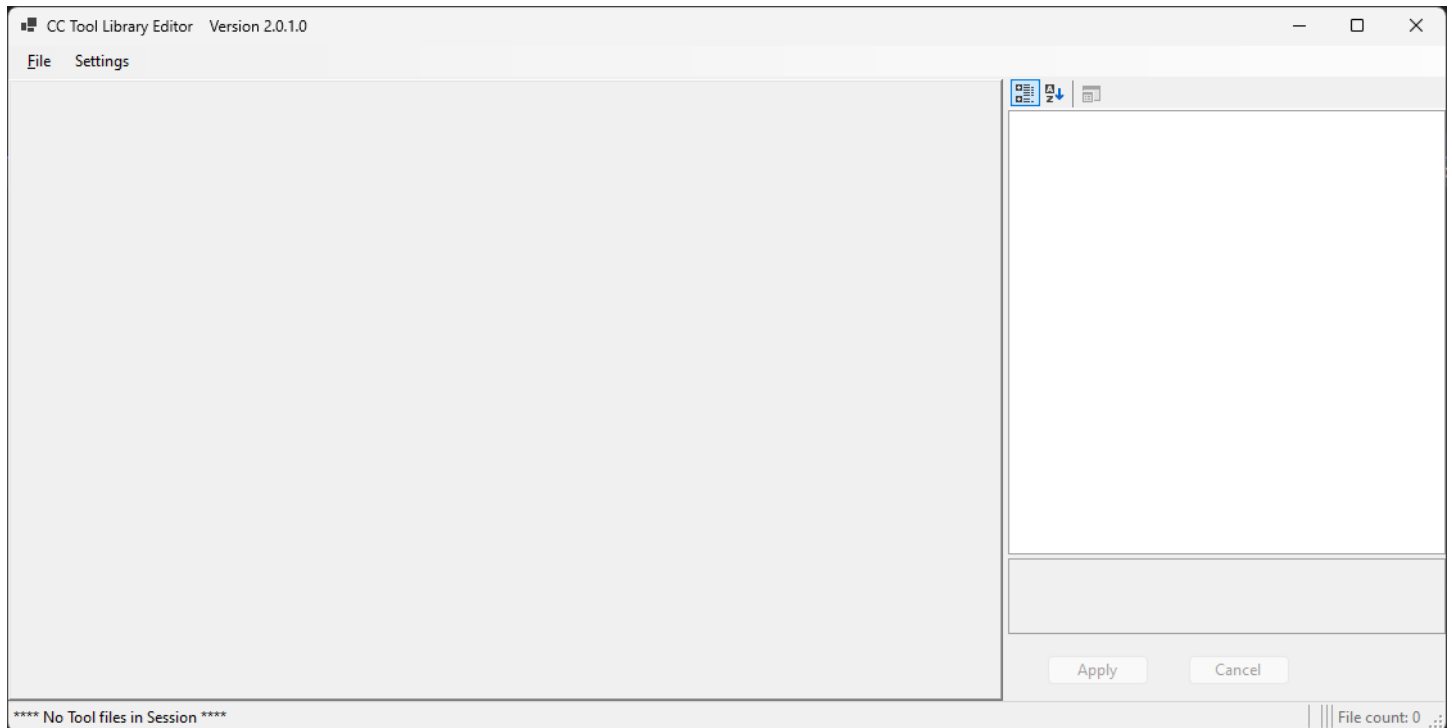
The Fusion 360 JSON file has a version. This program was written to version 24. I just updated F360 and found there are new properties that need to be added. This will happen again.

JSON files from AutoDesk, Amanna, Bits and Bits, Harvey Tools and SpeTools were used to find as many Properties as possible. The Expression usage varied between vendors, I am pretty sure I will miss some.

### Realities of mapping information.

- Tool Numbers
  - CC and F360 systems require a Tool number. There is no direct conversion option between formats. Any tool exported to a different format will have the Tool Number changed to 1000 + an increment based on the order in the current Clipboard contents. You will probably have to re-number the tools after export.
- Lack of parameters
  - The CC tool record has minimal information. There are properties that are not used by CC, but are used by this program during export i.e. CC Tool “Stickout” is F360 “LB” length below holder. There are properties that are not available in CC length of the Tool which becomes “OAL” overall length in F360.
- The conversion code is at the end of this document.

## Program GUI presentation



Start up shows an empty Left panel and Property Page with Buttons on the Right and a Status Bar at the bottom.

The Status bar left text field is used for messaging. **Dialogs are used very sparingly, so watch the messages!**

The Status bar right side two fields show the Current file name and Session open file count

The Status bar middle two fields are context sensitive per library format.

### Internal Unique ID's

The program uses a Session based internal Index for each Tool regardless of format. This is used for uniqueness testing when putting a Tool in a Clipboard. The program tries to keep a single instance of a unique tools in the Clipboard.

This is easily defeated so be aware. The effect is duplicate records in the target file. A value-based comparison is needed.

The program will create duplicate tools in files for both formats.

### New Tools

Use Add Tool to create a new blank Tool

The new tool Identifier – This is used in the GUI

- CC – The Number will be “NewTool” + an internal session based index
- F360 - The Description will be “NewTool” + an internal session based index

## On Exit

- Last used folder locations are saved per format.
- Screen size and location are saved.
- CC UI User Column Layout is saved.

# Navigation and Selection

CC Tool CSV uses a ListView control.

- Allows multiple record select
- The ListView is configurable in that you can Shift and Resize columns.
  - The default order of parameters is the same as the CSV file.
    - The default column width is calculated based on the text width of the parameter name.
  - The user arrangement can be saved by using the Settings -> ColumnLayout menubar option.
- The Property Page content shows common values across selected rows.
  - You can change any property value regardless if it has a value or not.
- The Status bar shows separate Select and Clipboard statistics
  - The ListView allows multiple selections, the Select verifies the count.
  - The Clipboard has a pull down to access Export functions and to Clear the Clipboard.

The screenshot shows the CC Tool Library Editor interface. On the left, a table lists tool entries with columns: Number, Vendor, Model, URL, Name, Type, Diameter, Cornerradius, Flutelength, and Shaft. Row 111 is selected. On the right, a property page for tool 111 is displayed, showing fields for Identification (Tool Number, Vendor, Model, Name, URL), Tool Definition (Type, Diameter, Corner Radius, Angle, Coating), and Cutting Data (Depth, RPM, Feed Rate 2D). The status bar at the bottom indicates 'Changed Selection', 'Select count: 1', 'Clip Tool count: 0', 'File: CCHardwood+Any+Any.csv', 'Tool count: 22', and 'File count: 3'.

Number	Vendor	Model	URL	Name	Type	Diameter	Cornerradius	Flutelength	Shaft
101	Carbi...	101	ht...		ball	0.125	0.0625	0.5	0
102	Carbi...	102	ht...		end	0.125	0	0.5	0
111	Carbi...	111	ht...		ball	0.0625	0.03125	0.25	0
112	Carbi...	112	ht...		end	0.0625	0	0.25	0
121	Carbi...	121	ht...		ball	0.0313	0.01565	0.0625	0
122	Carbi...	122	ht...		end	0.0313	0	0.0625	0
201	Carbi...	201	ht...		end	0.25	0	0.75	0
202	Carbi...	202	ht...		ball	0.25	0.125	0.75	0
205	Carbi...	205E	ht...		end	0.25	0	1	0
251	Carbi...	251	ht...		end	0.25	0	0.75	0
301	Carbi...	301	ht...		vee	0.5	0	0.25	0
302	Carbi...	302	ht...		vee	0.5	0	0.25	0
501	Carbi...	501	ht...		en...	0.125	0.005	0.5	0
502	Carbi...	502	ht...		en...	0.125	0.0025	0.5	0
322	Amana	4620...	ht...	Am...	end	0.25	0	0.75	0
323	Amana	4577...	ht...	Am...	en...	0.005	0	0.44	0
324	Amana	4617...	ht...	Am...	end	0.25	0	0.875	0
325	Amana	4637...	ht...	Am...	ball	0.25	0.125	1	0
326	Amana	4620...	ht...	Am...	end	0.125	0	0.5	0
327	Amana	RC-...	ht...	Am...	vee	1.0625	0	0.921	0

**Identification**

Tool Number	111
Vendor	Carbide 3D
Model	111
Name	
URL	https://shop.carbide3d.

**Tool Definition**

Type	ball
Diameter	0.0625
Corner Radius	0.03125
Angle	0
Coating	

**Cutting Data**

Depth	0.02
RPM	18000
Feed Rate 2D	35

**Name**

Vendor Product ID

Apply Cancel

Changed Selection Select count: 1 Clip Tool count: 0 File: CCHardwood+Any+Any.csv Tool count: 22 File count: 3

## F360 Tool library uses a TreeView control

- Allows Single Node select only
- The Property Page reacts to the object type selected.
- The Status Bar shows separate Datum and Preset Clipboard statistics
  - These have pulldowns to access Export functions and to Clear the Clipboard.

The screenshot displays the CC Tool Library Editor window. The main area is a tree view showing the hierarchy of tool categories. The selected tool is '1/16" Ball Endmill' under the 'F360Lib' category. The property page on the right shows the following details:

Misc	
Material	unspecified
Grade	Mill Generic
Description	1/16" Ball Endmill
GUID	4ff77d95-ba88-4ec9-b8e7-3
Last Modified	
Product id	
Product Link	
reference_guid	
Tapered type	
Type	ball end mill
Unit	inches
Vendor	

Below the property page, there is a 'Material' section with the value 'BMC' and a description: 'Select the material of the tool. Options include - ...'. At the bottom of the window, the status bar shows: 'Successfully opened 1 file(s) and Errors with 0 file(s) Clip Datum count: 0 Clip Preset count 0 File: f360millInch.json Tool count: 62 File count: 4'.

## File management

- Tabs are used to contain each file that is open. The file name is shown.
  - There are arrows to slide the Tabs if the width exceeds the available space.
  - You can not manually slide the Tabs to change the order.
- An \* asterisk prefix is added if the file has changed
- A "X" Delete Icon allows you to remove a specific file from the Session.
- You may open multiple files with the Open dialog
  - If you have an error on a file, it will be skipped and an error message will be displayed
- You can NOT display multiple files concurrently. This is a single document application.
- The current Tab text is shown in bold and the current file name is shown in the status bar.
- The Session current open file count is shown in the status bar.

Number	Vendor	Model	URL	Name	Type	Diameter	Cornerradius	Flutlength	Shaftdiameter	Angle	Numflutes	Stickout	Coating	
101	Carbi...	101	ht...	ball	0.125	0.0625	0.5	0	0	2	0.125			
102	Carbi...	102	ht...	end	0.125	0	0.5	0	0	2	0.125			
111	Carbi...	111	ht...	ball	0.0625	0.03125	0.25	0	0	2	0.125			
112	Carbi...	112	ht...	end	0.0625	0	0.25	0	0	2	0.125			
121	Carbi...	121	ht...	ball	0.0313	0.01565	0.0625	0	0	2	0.125			
122	Carbi...	122	ht...	end	0.0313	0	0.0625	0	0	2	0.125			
201	Carbi...	201	ht...	end	0.25	0	0.75	0	0	3	0.125			
202	Carbi...	202	ht...	ball	0.25	0.125	0.75	0	0	3	0.125			
205	Carbi...	205E	ht...	end	0.25	0	1	0	0	2	0.125			
251	Carbi...	251	ht...	end	0.25	0	0.75	0	0	2	0.125			
301	Carbi...	301	ht...	vee	0.5	0	0.25	0	90	2	0.125			
302	Carbi...	302	ht...	vee	0.5	0	0.25	0	60	2	0.125			
501	Carbi...	501	ht...	en...	0.125	0.005	0.5	0	60	2	0.125			
502	Carbi...	502	ht...	en...	0.125	0.0025	0.5	0	40	2	0.125			
322	Amana	4620...	ht...	Am...	end	0.25	0	0.75	0	2	0.125			
323	Amana	4577...	ht...	Am...	en...	0.005	0	0.44	0	30	1	0.125		



## Property Value access

A PropertyGrid that is used to change the parameter values. You must “Select” tools to edit the values.

The parameters can be shown in Categorized (default) or alphabetic order.

The PropertyGrid will show values for instances with equal values. You can change a value whether it has a value displayed or not.

The screenshot shows the CC Tool Library Editor interface. The main window displays a table of tool properties. The right-hand panel is open, showing the 'Tool Definition' and 'Cutting Data' sections. The 'Tool Definition' section includes fields for Type, Diameter (0.25), Corner Radius, Angle (0), and Coating. The 'Cutting Data' section includes fields for Depth (0.04), RPM (18000), Feed Rate 2D, and Plunge Rate. Below these sections are 'Apply' and 'Cancel' buttons. The status bar at the bottom indicates 'Changed Selection', 'Select count: 2', 'Clip Tool count: 0', 'Tool count: 22', 'File: CCHardwood+Any+Any4.csv', and 'File count: 7'.

Number	Vendor	Model	URL	Name	Type	Diameter	Cornerradius	Flutlength	Shaftdiameter	Angle	Numflutes	Stickout	Coating
101	Carbi...	101	ht...	ball	0.125	0.0625	0.5	0	0	2	0.125		
102	Carbi...	102	ht...	end	0.125	0	0.5	0	0	2	0.125		
111	Carbi...	111	ht...	ball	0.0625	0.03125	0.25	0	0	2	0.125		
112	Carbi...	112	ht...	end	0.0625	0	0.25	0	0	2	0.125		
121	Carbi...	121	ht...	ball	0.0313	0.01565	0.0625	0	0	2	0.125		
122	Carbi...	122	ht...	end	0.0313	0	0.0625	0	0	2	0.125		
201	Carbi...	201	ht...	end	0.25	0	0.75	0	0	3	0.125		
202	Carbi...	202	ht...	ball	0.25	0.125	0.75	0	0	3	0.125		
205	Carbi...	205E	ht...	end	0.25	0	1	0	0	2	0.125		
251	Carbi...	251	ht...	end	0.25	0	0.75	0	0	2	0.125		
301	Carbi...	301	ht...	vee	0.5	0	0.25	0	90	2	0.125		
302	Carbi...	302	ht...	vee	0.5	0	0.25	0	60	2	0.125		
501	Carbi...	501	ht...	en...	0.125	0.005	0.5	0	60	2	0.125		
502	Carbi...	502	ht...	en...	0.125	0.0025	0.5	0	40	2	0.125		
322	Amana	4620...	ht...	Am...	end	0.25	0	0.75	0	2	0.125		

There is an associated “Apply” and “Cancel” buttons within the Right panel to handle committing to updating the tool files. These become enabled when changes are made.

The screenshot shows the CC Tool Library Editor interface, similar to the previous one. The right-hand panel is open, and the 'RPM' property in the 'Cutting Data' section is highlighted. The status bar at the bottom indicates 'RPM property changed in Property value collection', 'Select count: 2', 'Clip Tool count: 0', 'Tool count: 22', 'File: CCHardwood+Any+Any4.csv', and 'File count: 7'.

Number	Vendor	Model	URL	Name	Type	Diameter	Cornerradius	Flutlength	Shaftdiameter	Angle	Numflutes	Stickout	Coating
101	Carbi...	101	ht...	ball	0.125	0.0625	0.5	0	0	2	0.125		
102	Carbi...	102	ht...	end	0.125	0	0.5	0	0	2	0.125		
111	Carbi...	111	ht...	ball	0.0625	0.03125	0.25	0	0	2	0.125		
112	Carbi...	112	ht...	end	0.0625	0	0.25	0	0	2	0.125		
121	Carbi...	121	ht...	ball	0.0313	0.01565	0.0625	0	0	2	0.125		
122	Carbi...	122	ht...	end	0.0313	0	0.0625	0	0	2	0.125		
201	Carbi...	201	ht...	end	0.25	0	0.75	0	0	3	0.125		
202	Carbi...	202	ht...	ball	0.25	0.125	0.75	0	0	3	0.125		
205	Carbi...	205E	ht...	end	0.25	0	1	0	0	2	0.125		
251	Carbi...	251	ht...	end	0.25	0	0.75	0	0	2	0.125		
301	Carbi...	301	ht...	vee	0.5	0	0.25	0	90	2	0.125		
302	Carbi...	302	ht...	vee	0.5	0	0.25	0	60	2	0.125		
501	Carbi...	501	ht...	en...	0.125	0.005	0.5	0	60	2	0.125		
502	Carbi...	502	ht...	en...	0.125	0.0025	0.5	0	40	2	0.125		
322	Amana	4620...	ht...	Am...	end	0.25	0	0.75	0	2	0.125		

The CC related property grid includes readonly calculated Cutting performance parameters that are not in the CC CSV format.

Number	Vendor	Model	URL	Name	Type	Diameter	Cornerradius	Flutlength	Shaftdiameter	Angle	Numflutes	Stickout	Coating
101	Carbi...	101	ht...	ball	0.125	0.0625	0.5	0	0	2	0.125		
102	Carbi...	102	ht...	end	0.125	0	0.5	0	0	2	0.125		
111	Carbi...	111	ht...	ball	0.0625	0.03125	0.25	0	0	2	0.125		
112	Carbi...	112	ht...	end	0.0625	0	0.25	0	0	2	0.125		
121	Carbi...	121	ht...	ball	0.0313	0.01565	0.0625	0	0	2	0.125		
122	Carbi...	122	ht...	end	0.0313	0	0.0625	0	0	2	0.125		
201	Carbi...	201	ht...	end	0.25	0	0.75	0	0	3	0.125		
202	Carbi...	202	ht...	ball	0.25	0.125	0.75	0	0	3	0.125		
205	Carbi...	205E	ht...	end	0.25	0	1	0	0	2	0.125		
251	Carbi...	251	ht...	end	0.25	0	0.75	0	0	2	0.125		
301	Carbi...	301	ht...	vee	0.5	0	0.25	0	90	2	0.125		
302	Carbi...	302	ht...	vee	0.5	0	0.25	0	60	2	0.125		
501	Carbi...	501	ht...	en...	0.125	0.005	0.5	0	60	2	0.125		
502	Carbi...	502	ht...	en...	0.125	0.0025	0.5	0	40	2	0.125		
322	Amana	4620...	ht...	Am...	0.25	0	0.75	0	0	2	0.125		

## CC Performance data Calculation

```

internal void UpdatePerformaceProps()
{
    if (this.Metric == 0)
    {
        // Surface speed ft/min
        this.SurfaceSpeed = Convert.ToDouble(Convert.ToDouble(this.Rpm) * (this.Diameter
* Math.PI) / 12);
    }
    else
    {
        // Surface speed Meters/min
        this.SurfaceSpeed = Convert.ToDouble(Convert.ToDouble(this.Rpm) * (this.Diameter
* Math.PI) / 1000);
    }

    // Feedrate
    this.FeedPerTooth = Convert.ToDouble(this.Feedrate / Convert.ToDouble(this.Rpm) /
Convert.ToDouble(this.Numflutes));
    // Plunge Feedrate
    this.PlungeFeedPerTooth = Convert.ToDouble(this.Plungerate /
Convert.ToDouble(this.Rpm) / Convert.ToDouble(this.Numflutes));
    // Max material removal
    this.MaxMaterialRemoval = Convert.ToDouble(this.Depth * ((this.Stepover3d / 100) *
this.Diameter) * this.Feedrate);
}

```

## Clipboards- Session based “buffer” to hold tools.

There are unique Clipboards for each supported object(s) per format.

The program attempts to ignore Duplicate tools in the Clipboards.

The Clipboard contents are independent of the file contents.

The Clipboards are NEVER CLEARED until you clear them.

The Clipboards provide a path to

- Copy tools between like formats

- Export tools to dissimilar formats

After a Tool Selection(s) you can access the Clipboard function via KeyStroke or RightClick

### ClipBoard access map

RightClick	KeyStroke	Carbide 3D	Fusion 360			
		CCTool	F360Library	Datum	StartValues	Preset
Add		X	X	X	X	X
Copy	Ctrl-C	X		X		X
Cut	Ctrl-X	X		X		X
Paste	Ctrl-V	X		X		X
Delete	Ctrl-D	X		x		X
Select All	Ctrl-A	X	X		X	
UnSelect All	Shift-A	X				

The context menus change if there are Tools selected or not.

The screenshot shows the 'CC Tool Library Editor' software interface. At the top, the title bar reads 'CC Tool Library Editor Version 2.0.1.0'. Below the title bar is a menu bar with 'File' and 'Settings'. The main window contains a table of tool specifications with columns: Number, Vendor, Model, URL, Name, Type, Diameter, Cornerradius, Flutelength, Shaftdiameter, Angle, Numflutes, Stickout, Coating, and Me. The table lists various tools from vendors like Carbi... and Amana. A context menu is open over the table, listing actions: Add Tool, Copy Tool, Cut Tool, Paste Tools, Delete Tool, Duplicate Tools, Select All Tools, and UnSelect All Tools. At the bottom of the window, there is a status bar with 'Cleared Selection', 'Clip Tool count: 0', 'Tool count: 22', 'File: CCHardwood+Any+Any4.csv', and 'File count: 7'. There are also 'Apply' and 'Cancel' buttons on the right side of the table area.

Number	Vendor	Model	URL	Name	Type	Diameter	Cornerradius	Flutelength	Shaftdiameter	Angle	Numflutes	Stickout	Coating	Me
101	Carbi...	101	ht...		ball	0.125	0.0625	0.5	0	0	2	0.125		0
102	Carbi...	102	ht...		end	0.125	0	0.5	0	0	2	0.125		0
111	Carbi...	111	ht...		ball	0.0625	0.03125	0.25	0	0	2	0.125		0
112	Carbi...	112	ht...		end	0.0625	0	0.25	0	0	2	0.125		0
121	Carbi...	121	ht...		ball	0.0313	0.01565	0.0625	0	0	2	0.125		0
122	Carbi...	122	ht...		end	0.0313	0	0.0625	0	0	2	0.125		0
201	Carbi...	201	ht...		end	0.25	0	0.75	0	0	3	0.125		0
202	Carbi...	202	ht...		ball	0.25	0.125	0.75	0	0	3	0.125		0
205	Carbi...	205E	ht...		end	0.25	0	1	0	0	2	0.125		0
251	Carbi...	251	ht...		end	0.25	0	0.75	0	0	2	0.125		0
301	Carbi...	301	ht...		vee	0.5	0	0.25	0	90	2	0.125		0
302	Carbi...	302	ht...		vee	0.5	0	0.25	0	60	2	0.125		0
501	Carbi...	501	ht...		en...	0.125	0.005	0.5	0	60	2	0.125		0
502	Carbi...	502	ht...		en...	0.125	0.0025	0.5	0	40	2	0.125		0
322	Amana	4620...	ht...	Am...	end	0.25	0	0.75	0	0	2	0.125		0
323	Amana	4577...	ht...	Am...	en...	0.005	0	0.44	0	30	1	0.125		0
324	Amana	4617...	ht...	Am...	end	0.25	0	0.875	0	0	2	0.125		0
325	Amana	4637...	ht...	Am...	ball	0.25	0.125	1	0	0	2	0.125		0
326	Amana	4620...	ht...	Am...	end	0.125	0	0.5	0	0	2	0.125		0
327	Amana	RC-...	ht...	Am...	vee	1.0625	0	0.921	0	60	1	0.125		0
602	Carbi...	602E	ht...	McFly	end	1	0	0.39	0	0	4	0.125		0
603	Carbi...	603E	ht...	McFly	end	1	0	0.39	0	0	4	0.125		0

CC Tool Library Editor Version 2.0.1.0

File Settings

f360millInch.json

- F360Lib
  - 1/16" Ball Endmill
  - 1/16" Flat Endmill
  - 1/16" Bullnose Endmill
    - Geometry
    - Maritool CAT
    - PostProcess
    - Start Values
  - 1/8" Ball Endmill
  - 1/8" Flat Endmill
  - 1/8" Bullnose Endmill
  - 3/16" Ball Endmill
  - 3/16" Flat Endmill
  - 3/16" Bullnose Endmill
  - 1/4" Ball Endmill
  - 1/4" Flat Endmill
  - 1/4" Bullnose Endmill
  - 5/16" Ball Endmill
  - 5/16" Flat Endmill
  - 5/16" Bullnose Endmill
  - 3/8" Ball Endmill

Context Menu:

- Add Tool
- Copy Tool
- Cut Tool
- Paste Tools
- Delete Tool
- Duplicate Tool

Properties Panel:

Misc

Material	unspecified
Grade	Mill Generic
Description	1/16" Bullnose Endmill
GUID	1592b8cb-a6f9-4ee6-a2a
Last Modified	
Product id	
Product Link	
reference_guid	
Tapered type	
Type	bull nose end mill
Unit	inches
Vendor	

Material

BMC

Select the material of the toolOptions inclu...

Apply Cancel

Successfully opened 1 | Clip Datum count: 0 | Clip Preset count 0 | Tool count: 62 | File: f360millInch.json | File count: 1

CC Tool Library Editor

File Settings

CCHardwood+Any+Any.csv Amanatools.json Harvey Tool-End Mills.json f360mill

Number	Vendor	Model	URL	Name	Type	Diameter	Cornerradius	Flutlength	Shaft
101	Carbi...	101	ht...	ball	0.125	0.0625	0.5	0	
102	Carbi...	102	ht...	end	0.125	0	0.5	0	
111	Carbi...	111	ht...	ball	0.0625	0.03125	0.25	0	
112	Carbi...	112	ht...	end	0.0625	0	0.25	0	
121	Carbi...	121	ht...	ball	0.0313	0.01565	0.0625	0	
122	Carbi...	122	ht...	ball	0	0	0.0625	0	
201	Carbi...	201	ht...	ball	0	0	0.75	0	
202	Carbi...	202	ht...	end	0.125	0	0.75	0	
205	Carbi...	205E	ht...	end	0	0	1	0	
251	Carbi...	251	ht...	ball	0	0	0.75	0	
301	Carbi...	301	ht...	end	0	0	0.25	0	
302	Carbi...	302	ht...	end	0	0	0.25	0	
501	Carbi...	501	ht...	ball	0.005	0	0.5	0	
502	Carbi...	502	ht...	end	0.0025	0	0.5	0	
322	Amana	4620...	ht...	end	0	0	0.75	0	
323	Amana	4577...	ht...	en...	0.005	0	0.44	0	
324	Amana	4617...	ht...	Am...	end	0.25	0	0.875	0
325	Amana	4637...	ht...	Am...	ball	0.25	0.125	1	0
326	Amana	4620...	ht...	Am...	end	0.125	0	0.5	0
327	Amana	RC-...	ht...	Am...	vee	1.0625	0	0.921	0

Context Menu:

- Add Tool
- Copy Tool
- Cut Tool
- Paste Tools
- Delete Tool
- Duplicate Tools
- Select All Tools
- UnSelect All Tools

Properties Panel:

CCPro

3D RPM	18000
3D Feed Rate	
3D StepOver	
Finish Allowance	1

Environment

Units	0
Note	

Legacy

Cut Power	
Flute Length	
Machine	
Number of Flutes	2
Shaft Diameter	0
Stick Out	0.125
Material	

Cut Power

CCPro Cut Power

Apply Cancel

Copied 4 tools | Select count: 4 | Clip Tool count: 4 | File: CCHardwood+Any+Any.csv | Tool count: 22 | File count: 4

The Status bar GUI will change based on library format type.

The Status bar Clipboard items have pull-downs for actions on the Clipboard.

- Clear the Clipboard
- Export tools
  - A target file MUST exist in the program session
  - All available target files are listed a menu Items

Number	Vendor	Model	URL	Name	Type	Diameter	Cornerradius	Flutelength	Shaft
101	Carbi...	101	ht...		ball	0.125	0.0625	0.5	0
102	Carbi...	102	ht...		end	0.125	0	0.5	0
111	Carbi...	111	ht...		ball	0.0625	0.03125	0.25	0
112	Carbi...	112	ht...		end	0.0625	0	0.25	0
121	Carbi...	121	ht...		ball	0.0313	0.01565	0.0625	0
122	Carbi...	122	ht...		end	0.0313	0	0.0625	0
201	Carbi...	201	ht...		end	0.25	0	0.75	0
202	Carbi...	202	ht...		ball	0.25	0.125	0.75	0
205	Carbi...	205E	ht...		end	0.25	0	1	0
251	Carbi...	251	ht...		end	0.25	0	0.75	0
301	Carbi...	301	ht...		vee	0.5	0	0.25	0
302	Carbi...	302	ht...		vee	0.5	0	0.25	0
501	Carbi...	501	ht...		en...	0.125	0.005	0.5	0
502	Carbi...	502	ht...		en...	0.125	0.0025	0.5	0
322	Amana	4620...	ht...	Am...	end	0.25	0	0.75	0
323	Amana	4577...	ht...	Am...	en...	0.005	0	0.44	0
324	Amana	4617...	ht...	Am...	end	0.25	0	0.875	0
325	Amana	4637...	ht...	Am...	ball	0.25	0.125	1	0
326	Amana	4620...	ht...	Am...	end	0.125	0	0.5	0
327	Amana	RC-...	ht...	Am...	vee	1.0625	0		

## Messaging

The Status bar shows Message information, Selection/Clipboard stats and open File counts.

The Status bar shows counts for

- All program messages
- CC tool Selected and Clipboard
- Fusion Datum Clipboard and Preset Clipboard
- Tool Count
- Current file name
- Session File Count

## Mapping formats

### CC tool to F360 Datum – This creates a Single Datum with a Single Preset

```
internal static Datum MapCCToolToF360Datum(int toolNumber, CCToolCSV ccTool, ref F360ToolLibrary
parentF360Lib)
{
    Datum datum = new Datum();
    datum.Parent = parentF360Lib;

    datum.Bmc = "unspecified";
    datum.Vendor = ccTool.Vendor;
    datum.ProductId = ccTool.Model;
    datum.ProductLink = ccTool.URL;

    datum.Geometry.Dc = ccTool.Diameter;

    if (datum.Type == "ball end mill")
    {
        datum.Geometry.Re = ccTool.Cornerradius;
    }
    else
    {
        datum.Geometry.Re = ccTool.Cornerradius;
    }
    // Match types
    switch (ccTool.Type)
    {
        case "end":
            {
                datum.Type = "flat end mill";
                break;
            }
        case "ball":
            {
                datum.Type = "ball end mill";
                //nextTool.Cornerradius = datum.Geometry.Dc / 2;
                break;
            }
        //case "bull nose end mill":
        //    {
        //        nextTool.Type = "ball";
        //        break;
        //    }
        case "vee":
            {
                datum.Type = "spot drill";
                break;
            }
    }
}

string diaFraction = decimalToFraction((double)datum.Geometry.Dc);
if (String.IsNullOrEmpty(ccTool.Name) == true)
{
    datum.Description = "#" + ccTool.Number + " - " + diaFraction + " " + datum.Type;
}
else
{
    datum.Description = "#" + ccTool.Number + " - " + ccTool.Name;
}
}
```



```

// Convert unit designation
if (ccTool.Metric == 1)
{
    datum.Unit = "millimeters";

    // NO overall Length in CCTool
    datum.Geometry.Oal = 80;
}
else
{
    datum.Unit = "inches";
    // NO overall Length in CCTool
    datum.Geometry.Oal = 3;
}

datum.Geometry.Lcf = ccTool.Flutelength;

if (ccTool.Shaftdiameter == 0)
{
    datum.Geometry.Sfdm = ccTool.Diameter;
}
else
{
    datum.Geometry.Sfdm = ccTool.Shaftdiameter;
}

datum.Geometry.Ta = ccTool.Angle;
datum.Geometry.Tp = 0;

datum.Geometry.Nof = ccTool.Numflutes;
datum.Geometry.Nt = 1;

datum.Geometry.Lb = ccTool.Stickout;

datum.Geometry.AssemblyGaugeLength = datum.Geometry.Lb;
datum.Geometry.ShoulderLength = datum.Geometry.Lcf;

datum.Geometry.ThreadProfileAngle = 60;
datum.Geometry.TipDiameter = 0;
datum.Geometry.TipLength = 0;
datum.Geometry.TipOffset = 0;

datum.PostProcess.Number = toolNumber;
datum.PostProcess.DiameterOffset = datum.PostProcess.Number;
datum.PostProcess.LengthOffset = datum.PostProcess.Number;
datum.PostProcess.Turret = 0;

Preset preset = new Preset();
datum.StartValues.Presets.Add(preset);

preset.Description = ccTool.Notes;
preset.Name = "Default Preset";

MaterialParams materialParams = new MaterialParams();
materialParams.Category = ccTool.Material;
preset.Material = materialParams;

// Feed Rates
preset.VF = ccTool.Feedrate;
preset.VFPlunge = ccTool.Plungerate;
preset.VFRamp = (ccTool.Feedrate - ccTool.Plungerate) / 2;
preset.VFLeadIn = preset.VFRamp;
preset.VFLeadOut = preset.VFRamp;

```

```
preset.VFRetract = ccTool.Feedrate * .6;
preset.VFTransition = preset.VF;

// RPM
preset.N = ccTool.Rpm;
preset.NRamp = preset.N;

preset.FZ = ccTool.FeedPerTooth;
preset.FN = ccTool.PlungeFeedPerTooth;
preset.VC = ccTool.SurfaceSpeed;

preset.Stepdown = ccTool.Depth;
preset.UseStepdown = true;

// CCTool StepOver is a percentage
preset.Stepover = datum.Geometry.Dc * 1 / ccTool.Stepover3d;
preset.UseStepover = true;

preset.ToolCoolant = "disabled";
// preset.VF = ccTool.Feedrate3d;
// preset.N = ccTool.Rpm3d;
return datum;
}
```

F360 Datum/Preset to CC Tool – This creates a CC Tool record for each Preset included

```
internal static CCToolCSV MapF360DatumToCCTool(int toolNumber, Preset preset, Datum datum)
{
    CCToolCSV nextTool = new CCToolCSV();
    nextTool.Number = toolNumber.ToString();
    nextTool.Vendor = datum.Vendor;
    nextTool.Model = datum.ProductId;
    nextTool.URL = datum.ProductLink;
    nextTool.Name = datum.Description;
    nextTool.Diameter = datum.Geometry.Dc;
    if (nextTool.Type == "ball")
    {
        if (datum.Geometry.Re != null)
            nextTool.Cornerradius = datum.Geometry.Re;
        else
            nextTool.Cornerradius = datum.Geometry.Dc / 2;
    }
    else
    {
        if (datum.Geometry.Re != null)
            nextTool.Cornerradius = datum.Geometry.Re;
        else
            nextTool.Cornerradius = 0;
    }
    // Match types
    switch (datum.Type)
    {
        case "flat end mill":
            {
                nextTool.Type = "end";
                break;
            }
        case "ball end mill":
            {
                nextTool.Type = "ball";
                nextTool.Cornerradius = datum.Geometry.Dc / 2;
                break;
            }
        case "bull nose end mill":
            {
                nextTool.Type = "ball";
                break;
            }
        case "spot drill":
            {
                nextTool.Type = "vee";
                break;
            }
    }
    //
    nextTool.Type = datum.Type;
    nextTool.Coating = datum.Bmc;
    // Convert unit designation
    switch (datum.Unit)
    {
        case "millimeters":
            {
                nextTool.Metric = 1;
                break;
            }
    }
}
```

```

        case "inches":
            {
                nextTool.Metric = 0;
                break;
            }
    }
    nextTool.Flutelength = datum.Geometry.Lcf;
    nextTool.Shaftdiameter = datum.Geometry.Sfdm;

    if (datum.Geometry.Ta != null)
    {
        nextTool.Angle = datum.Geometry.Ta;
    }
    else
    {
        nextTool.Angle = 0;
    }

    nextTool.Numflutes = (int)datum.Geometry.Nof;
    nextTool.Stickout = datum.Geometry.Lb;

    nextTool.Notes = preset.Description;
    nextTool.Material = preset.Material.Category;
    nextTool.Plungerate = preset.VFPlunge;
    nextTool.Feedrate = preset.VF;
    nextTool.Rpm = (int)preset.N;

    if (preset.Stepdown != null)
    {
        nextTool.Depth = preset.Stepdown;
    }
    else
    {
        nextTool.Depth = 0;
    }

    if (preset.Stepover != null)
    {
        nextTool.Stepover3d = preset.Stepover;
    }
    else
    {
        nextTool.Stepover3d = 0;
    }

    nextTool.Feedrate3d = preset.VF;
    nextTool.Rpm3d = preset.N;

    nextTool.Finishallowance = 0;

    nextTool.UpdatePerformaceProps();

    return nextTool;
}

```